

# Pre-tertiary engagement with online learning

Exploring uses of online learning environments and digital  
technology for progression into and through Higher Education

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# Preface

Pamoja Education has been developing and delivering online courses to 16 to 19 year old International Baccalaureate (IB) Diploma Programme students since 2009. As the only approved IB online course provider, our mission is to support the IB's initiative in helping students around the world to achieve their full potential through innovative online teaching and learning.

We consistently strive to improve Pamoja Education's online courses, learning tools and pedagogy, in order to provide the very best support for students in preparation for the next stage of their learning. Following five years of continued development, we feel it is the right time to invest in independent, qualitative research to explore how the pre-tertiary experiences of online learning with Pamoja Education influence students' transition into and through Higher Education.

From this research, we hope to show how pre-tertiary online learning can provide a critical component for today's modern, digitally-orientated students.

Edward Lawless, Principal, Pamoja Education

# Introduction

This report outlines work undertaken by the Institute of Education to explore how pre-tertiary experiences of online learning influences students' successful transitions into and through Higher Education. The work was commissioned by Pamoja Education, and the studies that were undertaken focused on the experiences of students and staff taking part in Pamoja Education courses offered as part of the International Baccalaureate Diploma Programme.

The work involved reviewing previous literature about the role of technology in preparing students for University study; undertaking a survey of International Baccalaureate students (including Pamoja Education alumni) to explore their experiences; interviewing Pamoja Education alumni as a way of explaining and elaborating these patterns of experience; and asking teachers to reflect on how they worked with learners to support them online. Each of these areas of work is reported in a separate section of this report.

The implications for Pamoja Education are drawn together in Appendix A, and instruments used to test or develop students' readiness for online study are reviewed in further detail in Appendix B.

The research team was led by Dr. Lesley Gourlay and Professor Martin Oliver, and involved Dr. Myrrh Domingo, Dr. Lin Pan and Jade Hunter. It was undertaken between February and May, 2014.

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# Literature review

## Overview

This literature review provides an overview of key papers, research projects and reports focused on pre-tertiary online engagement. Eight themes were identified that characterise uses of online learning environments and digital technology for preparation for progression into and through Higher Education. This section is structured to provide a synthesis of the main arguments and concepts in each thematic strand.

The eight themes are as follows:

### 1 Technology and online learning in schools

Current research has identified changes in the way society uses technology, and indicated ways in which these developments are reflected in proposals to reform school curricula. It is argued that differences in access, resources, practices and cultures must be accounted for to help varied learners adapt to these changes in society. Mobile devices in particular blur boundaries between education, leisure, and work, which can disrupt the way schools are organised in terms of spaces and patterns of time for study. It is widely recommended that curricula focus more on creativity and values, global cultures, and new media cultures.

### 2 Using online resources and digital technology to support student induction into HE

A number of studies examine the value of online resources and digital technology for student transition and induction into HE. Initiatives have included using online games and virtual learning environments to disseminate information to students and to expand their networks across the HE community. An essential aspect of transition support is to provide students with pastoral, academic and social resources prior to beginning their studies, and in so doing, alleviate some of the tensions and anxieties associated with navigating new learning environments.

### 3 Using online resources and digital technology to facilitate student social interaction and sustain their involvement in Higher Education

Research focuses on using technology to sustain student involvement in HE, particularly through establishing new relationships with staff and peers. The literature suggests online spaces provide additional support beyond face-to-face and classroom interaction, including peer-to-peer feedback and new forms of collaboration with staff. Students may benefit by corresponding professionally online with the wider academic community, and by working towards the self-directed management of their studies.

- 4 Using online resources and digital technology to differentiate instruction and develop student-centred approaches for diverse learners

The widening background of students participating in HE and the growth of distance education programmes have generated interest in developing differentiated instruction and student-centred approaches. The varied needs of students, including the range of abilities and styles of learning they demonstrate, could be better addressed by blending established pedagogical practices with innovative uses of technology.

- 5 Using online resources and digital technology to enhance students' academic learning and HE skills development

A body of work asserts that an essential aim of integrating online resources and digital technology into Higher Education is to foster transferable academic and professional skills. The research in this area recommends using online resources and digital technology to support students' self-directed study skills, such as using mobile, portable and digital devices to promote motivation and organisation.

- 6 Using online resources and digital technology common to everyday experiences to develop contemporary communication competencies

Research points to the significance of drawing from students' use of technology in their everyday lives as a way of responding to their preferences and recognising their technology skills, while simultaneously keeping their focus on academic tasks. This area of work has particular relevance for developing online learning environments that engage learners in generating content and engaging socially with peers.

- 7 Using online resources and digital technology for self-regulated learning

Self-regulated learning (SRL) is seen as a key mechanism for addressing the needs of the increasing number of Higher Education students, particularly given the growing diversity of their backgrounds. Technology is frequently associated with this approach. A key benefit of SRL specific to online learning environments is its potential for attending to students' individual differences in learning and reflecting the individual needs of students.

- 8 Using online resources and digital technology to facilitate intercultural communication

There is growing interest in developing the intercultural communication competences of students to prepare them for active participation in an increasingly globalised and multicultural society. Participation in virtual learning environments is seen as one way of achieving this, although doing this successfully is more complicated than just having students from different backgrounds enrol in the same online course. However, effective pedagogical approaches such as helping students accomplish collaborative tasks with diverse groups of people can facilitate intercultural communication, encouraging global networks of students to interact with peers from different linguistic, cultural and participation backgrounds.

## Background and Scope of the Literature Review

Concerns about whether online learning can meet the standards of face-to-face education are long standing. Despite this, decades' worth of media comparison studies confirm that contrasts between such broad 'modalities' of learning as 'online' and 'face-to-face' reveal very little. A consistent finding from such research is that modality does not predict any significant differences in learner achievement one way or the other (Reeves, 2005).

More recently, efforts have been made to investigate such comparisons more carefully; this has shown that what improves learner performance is not the modality, but the effort invested in the design of the course and the amount of time that learners spend studying. A meta-analysis of comparative research found that, on average, students in online learning conditions performed modestly better than those receiving face-to-face instruction. The blended conditions often included additional learning time and instructional elements not received by students in the face-to-face control conditions. This finding suggests that the positive effects associated with blended learning should not be attributed to the media, *per se* (US Department of Education, 2010).

Consequently, efforts have now turned to scrutinising the conditions under which learners benefit the most from online learning. It has been asserted, for example, that learners benefit from educational materials that mimic the design of games (Prensky, 2001); the evidence to date, however, is that although there are lessons that can be learnt from the design of games, particularly in terms of motivation and engagement (Gee, 2004), no single tool or approach can be assumed to benefit a whole generation of learners (Bennett et al, 2008). Nonetheless, learners do need to develop strategies for working online. For example, research into the ways in which students work in their 'study nests' (Crook, 2002) shows that multi-tasking is typical, and can be distracting, with students often blaming themselves for their inability to focus on their coursework when social media such as Facebook beckon (Andersson et al, 2014).

One way of responding to these issues has been to undertake more focused studies of online engagement and experiences among students, educators and learning institutions. There has been limited research in this area, and as such, the effectiveness of using online learning to prepare student for transition into and through HE remains largely unexamined. For this review, the range of literature specific to this area was therefore supplemented with peer reviewed academic literature and research reports from closely related fields, including learners' experiences of online learning, young peoples' use of new media, and transitions to Higher Education.

The thematic strands in this report provide a synthesis of current and seminal literature in the field. The explication of themes is therefore organised by sections to include the following: (1) a brief synthesis of main arguments and findings established in the growing body of literature; (2) a reference to most commonly used online resource or digital technology affiliated with the areas of study; and (3) a synopsis of specific pedagogical and technical design recommendations gathered from the reviewed literature.

## Eight key themes relating to pre-tertiary online engagement and learner progression

### Theme 1: Technology and Online Learning in Schools

Technology has been used extensively in schools for decades. However, it has been argued that recent changes in the way society uses technology make it a priority to reform school curricula (Williamson, 2013). Schooling, Williamson proposes, must reflect the complex way in which society now works with technology, rather than relying purely on 'transmissive' pedagogies.

*Its keywords are "networks," "connections," and "decentralisation," as well as a family of related centrifugal terms. These keywords articulate a shift from a centred tradition of thinking about schooling, as an institutional process that happens on school premises through formal pedagogic techniques of transmission, to an emerging decentred vision where learning is centrifugally dispersed and cybernetically distributed into society through new technologies, communication networks, the informal pedagogies of media, and emerging social practices of interest-based, peer-to-peer, just-in-time participatory learning. (Williamson, 2013: 9).*

It is easy to overstate the degree of change that schools are likely to experience (Laurillard, 2008), however, and educational policy repeatedly latches onto new technologies in the hope that these will, finally, overwhelm the complex challenges that education faces (Pelletier, 2009). Nevertheless, such arguments do make the case that 'knowledge work' in society is changing, and that schools will need to help learners adapt to this situation. Such arguments are often framed in terms of 'digital divides': differences in access, resources, practices and cultures that can prevent individuals from participating in society (Selwyn & Facer, 2007). Selwyn (2003), for example, describes how the use of mobile devices blurs boundaries between education, leisure and work, which can disrupt normalised patterns of activity and behaviour, and the way schools organise these in terms of spaces and patterns of time for study. Williamson (2013) further argues that, in response to this, curricula need to focus more on creativity and values, global cultures, and new media cultures, rather than on established routines.

It is not, however, clear how schools are to achieve this. A recent report (Staker, 2011) on blended learning in schools – the introduction of online components into the curriculum – presented 40 case studies and described "emerging models" rather than providing any single successful path for schools to follow. Online courses in schools were initially a matter of necessity in remote and geographically dispersed areas, but they have grown in popularity since then, and have begun to shake off the early stigma associated with their 'remedial' role (Muirhead, 2000). Online learning is now seen as having distinct benefits, being disruptive, and growing rapidly:

*Roughly 10 percent of students in 2003 took at least one online course. By the fall of 2009, that number had grown by 20 points. Half of all postsecondary students will take at least one class online by 2014. (Staker, 2011: 3)*

Staker's figures are specific to the USA, but nonetheless suggest that pre-tertiary experiences of online learning are becoming more commonplace; it is therefore increasingly important to understand how best to design such experiences. Usefully, six broad models are drawn out:

1. Face-to-Face Driver: online learning supports or remediates class-based work.
2. Rotation: classroom experience is 'rotated' on a fixed schedule with online, self-paced study. This may be split between on-site and remote learning.
3. Flex: an online platform delivers most of the curricula, with teachers providing online support as needed.
4. Online lab: a course is delivered online, with online tutors, but in a brick-and-mortar lab environment supervised by paraprofessionals.
5. Self-blend: students opt for self-contained online modules, remotely studied, taken online alongside their class-based courses.
6. Online driver: the course is delivered exclusively online, or on occasion allows for face-to-face 'check ins'.

However, a subsequent report (Staker & Horn, 2012: 1) recommended dropping model 1 and 4, "because they appear to duplicate other models and make the categorisation scheme too rigid to accommodate the diversity of blended-learning models in practice. By moving from six to four overarching models, we have created more breathing room in the definitions." The final model was also renamed the "enriched-Virtual model", "a whole-school experience in which within each course (e.g., math), students divide their time between attending a brick-and-mortar campus and learning remotely using online delivery of content and instruction" (p15).

This development of the model reflects an increased emphasis on 'blended' rather than purely online courses. Blended learning has been defined in this context as "a formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home" (Staker & Horn, 2012: 3).

Staker's analysis of the 40 cases (2011: 9) suggests that supervised, class-based experiences continue to dominate secondary schooling, even in blended learning contexts, with opportunities for remote, online learning remaining relatively rare. However, there is growing evidence of the 'unbundling' of the functions of schooling from schools as institutions, with responsibilities for education being shared amongst an increasingly diverse and complicated set of partners (Hess, 2012).

Stylistically, however, the emphasis in the design of learning has been placed on developing more social and interactive uses of technology – pushing against the prevalence of remote online self-study described by Staker (2011). Because processes of learning are argued to involve inquiring, collaborating, authoring and publishing, Selwyn (2008) argues that the development of online education needs to emphasise the

social nature of learning, in relation to areas such as playfulness, expressiveness, reflection and the exploration of knowledge.

Importantly, however, care must be taken to prepare young people to engage with such curricula. Bennett et al (2008) argue that, given the evidence currently available, it would be unwise to assume that all young people are 'digital natives', fluent in the use of technology. Their study showed that significant minorities still do not make use of any given technology. Moreover, even when young people do make use of new technologies, their patterns of use may be relatively simple – for example, surprisingly few learners are ready to use them as tools for production rather than consumption, and even if they manage this outside of school contexts, they may experience a sense of 'digital dissonance' when asked to do so as part of the formal curriculum (Clark et al, 2009). Indeed, close analysis of young peoples' use of new technology shows 'little evidence of groundbreaking activities and only a few embryonic signs of criticality, self-management or metacognitive reflection', meaning that 'these higher order thinking skills need to be encouraged and supported in any attempt to use Web 2.0 for learning in formal education' (Clark et al, 2009: 87). Learners in this study were heavily dependent on school input for finding resources, and for the most part, were only able to use new technologies in creative and interesting ways when supported by teachers to do so.

This capacity may help learners to use individual tools successfully, but they still do not guarantee that learners will be able to complete a course online. It is well established that learning online can be an isolating experience; students need to learn to make their presence felt to others, and read the cues online that others are present, if they are to persist in their studies and be successful (Kehrwald, 2008). Further studies (e.g. Lee et al, 2013) have gone on to show that it was those students who reported higher levels of academic locus of control and metacognitive self-regulation who are most likely to persist throughout online courses.

## **Theme 2: Using online resources and digital technology to support student induction**

Online induction, much like campus-based orientation, is aimed at acclimatising students into Higher Education. Literature in this area emphasises that student induction must be both an academic transition and also a wider social, cultural and practical one. A number of studies have utilised online and digital resources to ease student transition into university life and to increase student retention. The work ranges from providing an online repository of resources (e.g., handbooks, guidelines, FAQs, how-to hand-outs) to more interactive models such as the use of games (Piatt, 2009; Whitton, 2009), podcasts (Robinson, et. al., 2009) and social networking sites (Eberhardt, 2007) for conveying important information and engaging learners.

Lefever and Becka (2010) examined projects and initiatives within Higher Education institutions that employed online resources to address key transition issues in the early stages of university. These schemes, although varied and expansive in their design, often targeted similar areas, such as managing student expectations of academic study, linking students to available support services, and facilitating opportunities for social interaction. Online induction generally combines pastoral, academic and social provision prior to the



start of coursework, in order to alleviate some of the tensions and anxieties associated with navigating a new learning environment (Hills, 2006; Cook & Rushton, 2008).

One example of this is Whitton's (2009) development of Alternate Reality Games for Orientation, Socialisation and Induction (ARGOSI). The model was devised to avoid 'contextless induction' and instead offer students a series of collaborative challenges within a gaming framework. Key aims of this initiative were to help students learn basic information literacy skills (e.g., library and information skills induction), acclimatise to the Higher Education setting (e.g., campus and city), while simultaneously being immersed in an interactive online experience with other students. Online induction in this example is more than access to a repository of information (e.g., handbooks); it is also an opportunity to engage with the larger Higher Education community as well as an interactive approach for developing Higher Education skills.

Harrell (2008) approaches online induction experiences from a more academic standpoint. He posits that orientation should mimic the structure of online courses to expose students to a more 'realistic' perspective of what participation entails (e.g., required computer skills and 'NetEtiquette'). While navigating the technical features of a virtual learning environment can be conveyed through informational handouts, videos or other self-directed instructional demos, orienting students should also help them to gain a realistic perspective of academic expectations. Harrell considers engaging actively with others, understanding the academic policies that govern student participation, and emphasising the time management skills required to be essential aspects of online orientation (Harrell, 2008).

The induction activities that were referenced in the literature included a variety of online and digital resources. Those most prevalently utilised were:

- "How-to..." podcasts
- Downloadable campus information packs (e.g., maps, general contact info)
- Online discussion forums/message boards
- Virtual Learning Environments (e.g., Blackboard, Moodle)

Beyond these commonalities in uses of online and digital resources, there is a shared recognition that the duration of support for effective transition into Higher Education should be extended beyond the standard orientation period at the start of the first term, to include pre-entry engagement with Higher Education and to continue well into the first year experience (Whittaker, 2007). In this context, managing Higher Education preparedness includes developing transition mechanisms before, during and after enrolment (Wozniak, 2009; Harrell, 2008; Forrester, et. al, 2005; Cook & Rushton, 2008).

### **Theme 3: Using online resources and digital technology to facilitate student social interaction and sustained involvement throughout Higher Education**

The literature indicates that increased interaction online is being beneficial for sustained student involvement. Students are in need of online exchanges that will help them build

networks of support throughout their university experience. In this regard, efforts should be made to help students adapt popular uses of technology in ways that are better suited to use in Higher Education.

For example, it has been noted that students entering HE institutions often turn to their digital, mobile and portable devices to connect with distant friends and families. Such examples of using Social Networking Sites (SNS) helps students maintain relations with friends and family at a distance (Madge, et. al, 2009). While such a claim appears most relevant for campus-based students, opening channels for online connectivity is also important in distance learning contexts where students can feel isolated from their peers (Harrell, 2008), lacking a sense of the 'social presence' of other learners or even the tutor (Little, et. al, 2008). It is therefore an essential element of building online networks to help students establish new friendships as they enter the HE setting while also targeting their sustained academic involvement with the HE community (Robinson, et. al, 2009). Literature highlights, for example, the use of online resources and digital technology to establish students' professional relationships, for example through peer and faculty mentoring, or communication with administrators and staff about their academic needs (JISC, 2009a; HEFCE, 2009).

Equally important is how the combined technical and pedagogical design of online learning environments is configured to shape different types of engagement for sustaining student interaction throughout their university experience. Take for example, how Virtual Learning Environments like Blackboard or Moodle can be designed to inculcate students in 'transmissive' pedagogies that leave little room for creativity, critical thinking and social interactivity. Yet, Virtual Learning Environments can also be shaped to utilise more peer-to-peer, participatory learning experiences that promote uptake of curricula in less regimented ways without compromising academic rigor. Thus, it is often recommended that common everyday and popular uses of technology for social purposes be utilised to create academic exchanges online that keep students connected to the wider learning community (Dunlap & Lowenthal, 2009; Little, et. al, 2008). Such spaces have often been modelled after SNS, which by design can be organised to facilitate meeting others online who share similar academic interests or focus of study. Eberhardt (2007), for example, explores SNS as a resource for faculty, staff and administrators to help enhance students learning and development. Applications may also involve the development of an online forum where students can discuss academic concerns beyond assignment-based tasks. Robinson *et al* (2009) point to the practicality of online discussions for facilitating student socialisation within Higher Education. The general trend is to draw on the social networking behaviour of young people to increase their discussions about university life even after the initial stages of transition. In this way, online communication can continue to aid students by providing a "valuable means of discovery and connection within their educational community" (p. 22).

The literature in this area references a variety of technologies that can be harnessed to provide students with sustained involvement. Key examples include:

- Social Networking Sites (SNS) such as Facebook and Twitter
- Virtual Classroom/Virtual Lounge

- Weblogs
- Instant Messaging (IM)
- On-line discussion boards

Developing students' collegial conversations online provides benefits for their future academic involvement (Kadirire, 2007). By shaping the initial experience of students with such learning environments, they learn to see the use of technology to generate content through social interaction as normal, rather than just viewing it as a way to access content. This primes students from the beginning of their online Higher Education experience to be active learning participants rather than passive consumers of content.

#### **Theme 4: Using online resources and digital technology to differentiate instruction and develop student-centred approaches for diverse learners**

As noted earlier, growing numbers of students from 'widening participation' backgrounds within Higher Education suggest that there is a need to develop new forms of support and pedagogy. Research evidence shows that this includes the development of effective online learning models that can help personalise learning (HEFCE, 2009) and attend to the increasingly varied needs, abilities, interests and learning styles of students. As a result, Virtual Learning Environments are seen as having the potential to be rich learning spaces in which interactive and engaging pedagogies can be developed (JISC 2009a; Williams & Chinn, 2009). Such pedagogies could for example differentiate instruction based on delivery (Heaton-Shrestha, et. al, 2009), content (Lee & Chan, 2007) and interest (Laing, et.al, 2005; Currant, et. al, 2008; Shroff & Vogel, 2009).

Similarly, the use of student-centred approaches is frequently referenced as helping students to manage individual and collaborative group learning (HEFCE, 2005; Jones & Peachey 2005; Ng, 2007; Slevin, 2008). Examples include problem-based learning (JISC, 2009b), research and inquiry based learning (HEFCE, 2009) as well as learning by creating and generating content (Armstrong *et al*, 2009).

The literature in this area also highlights the integration of various digital materials as essential educational resources (HEFCE, 2005; Kadirire, 2007), particularly for distance-based students or those who balance their studies with work commitments (Hewitt-Taylor, 2003). Such digital materials are recommended to range in scope and employ a variety of representations (e.g., visuals, written documents, videos), in order to support a variety of approaches to learning. Examples include the use of classroom response systems to facilitate interactive lectures (Draper & Brown), web conferencing (McBrien, et.al, 2009), e-assessment and feedback (HEFCE, 2009) and using digital authoring platforms to help students retain course content (Steele, 2008).

Reflecting this, the following technologies have often been identified in this literature as offering valuable opportunities for engaging different needs, interests and learning styles of students:

- Web 2.0 technologies, including wikis and blogs (to promote authoring)

- Electronic Voting Systems, such as iClicker or Qwizdom (for interaction in lectures)
- Elluminate (web conferencing)
- Idea mapping tools, SecondLife (useful in problem-based learning programmes)
- Web 3D, blogs, wikis, SNS (supporting online collaboration)
- Podcasts via iPods, PDAs, MP3 players (used in differentiated learning)
- Mobile phones (when used as preparation for participation in lectures)

Not all of these are suitable for online learning – for example, lecture-based voting systems may have little to offer distributed, primarily asynchronous courses.

### **Theme 5: Using online resources and digital technology to enhance student academic learning and HE skills development**

Studies have shown that student retention in online courses is much lower than in similar face-to-face courses. One technique used to improve retention figures is by filtering those applying to courses, using readiness instruments and scales as part of institutional entry requirements (Carr, 2000, as cited in Harrell, 2008). These scales are often employed to evaluate learning style, technology skills and self-efficacy, in order to determine if a student's individual characteristics are suited to the demands of an online environment.

The work in this area suggests that certain students are 'at-risk' in the online environment in ways that they may not be in traditional face-to-face learning contexts. It is, however, a common for non-traditional students to take an online course specifically because it is their only enrolment option (e.g., scheduling, work responsibilities, or to accommodate physical disabilities) for completing post-secondary education (Harrell, 2008). For such purposes, student readiness instruments are seen as beneficial in alerting tutors and the students themselves to the challenges they face, and to aid in developing specific support measures to overcome these. It is only at this point that such instruments move beyond exclusion towards having a role in developing and helping learners.

Initiatives that focus on maximizing student retention also discuss the uses of technology to support student study and communication skills. This includes the use of mobile, portable and digital devices to promote self-efficacy, motivation and organisation for academic learning (Deepwell & Malik, 2008). In this way, online and digital resources are described as aiding student self-awareness and independent learning (Harley, et. al, 2007) and providing increased access to curricular material for students with special needs (Ferrell, et. al, 2007; Hardy, et. al, 2009; Sharpe, et. al, 2009). Technology is also seen as providing additional and extended access to lectures, storing and retrieving information, as well as to preparing for exams outside of class time (Shroff & Vogel, 2009; JISC, 2007). The literature points to the use of the various digital resources for fostering

academic tasks linked to disciplines, information literacy skills and critical thinking (Burgess, 2009). The most commonly referenced resources include:

- Online self-assessment tools
- Online surveys
- Online or digital profiling tests
- Virtual Learning Environment, used to access academic and subject focused content
- Online discussion forums for feedback
- Podcasts to retain and review lectures
- Wikis used to engage learning with broader audiences

The first three items – self-assessment, surveys and profiling – are intended here as ways to assist with self-awareness, rather than as a mechanism for exclusion. Such practices are often associated with fostering students' self-directed and independent learning (Tsai, et. al, 2011; Wang, et. al, 2011; Jacobson & Azevedo, 2008).

Online collaboration, critical analysis, technical and web awareness are also seen as valuable for post-study employability (JISC, 2009a, 2009b; HEFCE, 2009; Armstrong, et.al, 2009; Williams & Chin, 2009).

Further information on the instruments used to assess students' readiness for online study is provided in Appendix B.

### **Theme 6: Using online resources and digital technology common to everyday experiences to develop contemporary communication competencies**

A key feature of the literature reviewed in this area is the design of online resources for students who already make extensive use of technology outside of education. A key area of research posits the positive attributes of reappropriating popular technologies for academic purposes (e.g. Prensky, 2001; Gee, 2004). Research points to the importance of drawing on students' use of technology in their everyday lives in order to respond to their communication preferences while simultaneously keeping their interest focused on academic tasks. For example, digital materials used in out-of-school-contexts (e.g., social media; gaming) are considered to be valuable for designing virtual learning environments that engage learners. Digital and online materials often referred to in this area of research include:

- SMS
- Instant Messenger
- Streaming media

- Mobile computing
- Podcasting

This literature points to the possibility of using such technology to make meaningful academic connections to students' established communication styles (Williams & Chinn, 2009), and advocates incorporating technology that is already familiar from students' everyday interaction into education, thereby extending students' ability to use technology beyond social contexts (Wozniak, et. al, 2007; Flynn *et al*, 2005; HEFCE, 2009).

Examples include using technology to enhance, supplement and combine traditional methods of teaching as well as to support the kinds of differentiated learning described earlier (Heaton-Shrestha, et. al, 2009). It is suggested that the design of online learning environments should integrate some features of contemporary communication (e.g., SNS, streaming media, podcasting) in order to engage learners in more interactive and varied ways.

### **Theme 7: Using online resources and digital technology for self-regulated learning**

There was frequent mention in the literature across all the preceding six themes to the use of contemporary technologies to facilitate self-regulated learning (SRL). Although SRL is not a new method of teaching, it has been advocated as a valuable critical approach to facilitate students' learning in online environments (Tsai, et. al, 2011; Wang, et. al, 2011; Jacobson & Azevedo, 2008). Existing reviews of research on self-regulated learning emphasise its potential for representing students' individual differences and drawing attention to their individual needs (Duckworth, et. al, 2009; Meyer, et. al, 2008). Now that Higher Education institutions are recruiting increasing volumes of students from widening participation backgrounds, self-regulated learning is seen as a key mechanism for addressing their needs (cf Cassidy, 2011).

Self-regulated learning research seeks to explain how individuals use systematic methods of learning to improve their performance and adapt to changing educational contexts (Zimmerman, 2006; Zimmerman & Schunk, 2001; Cassidy, 2011). SRL is considered vital for lifelong learning (Ifenthaler, 2012) and to be one of the key success factors in online learning (Adeyinka & Mutula, 2010).

Traditional SRL research examines the self-directed processes through which learners transform mental abilities into task-related academic skills (Zimmerman, 2001). Three common criteria appear across most self-regulated learning theories. Cassidy (2011: 992) synthesises the different versions of these criteria as follows:

- Purposive use of specific processes, strategies or responses by students to improve their academic achievement;
- The use of a self-oriented feedback loop, in which students monitor the effectiveness of their learning strategies and respond to feedback with changes in self-perceptions or learning strategies; and

- A motivational dimension — involving self-efficacy beliefs — that determines their choice of particular self-regulatory processes, strategies or responses.

Cross-cultural psychology highlights how conceptions of SRL expand existing metacognitive theories to also account for the cultural dimensions and collaborative nature of student work in authentic learning situations (Shi, et. al, 2013; Kagitcibasi & Berry, 1989; Purdie & Hattie, 1996). In this way, SRL is not only a self-directed endeavour but is also significantly influenced by previous social experiences of students. This is to say, SRL can be informed by a sense of *individualism* or *collectivism* (Shi, et. al, 2013). This area of research positions the tension between individualism and collectivism as primarily being a West-East cultural difference, with American culture generally emphasising a more individualistic stance whereas Japanese culture is “one in which interdependency, collaterality and subordination of the individual to the group or family are emphasised” (Olaussen & Braten, 1999).

Both metacognitive and cross-cultural definitions of self-regulated learning promote a scaffolded approach for students to manage their learning. Such approaches are often associated with computer-based learning environments (CBLEs), which include web-based learning environments and hypermedia learning environments. CBLEs are widely used in the field of education in order foster the learning of challenging concepts such as scientific topics (Devolder, et. al, 2012). They are seen as a prime resource for self-directed learning because they are characterised by open-endedness, the use of multiple representational formats, and simultaneously offer non-linear and non-sequential structured delivery of content (Land & Hannafin, 2000). In other words, the web and hypermedia provide students with access to information that goes beyond a linear reading path. The “modularity” with which content can be represented enables students to exercise greater control over their own learning process, as they access content based on their own interests, goals and needs (Domingo, Jewitt, & Kress, 2014).

Self-regulated learning was conceptualised prior to the widespread use of ICT in educational contexts. The resurgence of the literature in this field has been informed by current innovations in technology. A noteworthy body of research focused on developing students’ academic independent learning in online and virtual learning environments has also been referred to as ‘self-directed learning’ (SDL). The collection of literature in this area both draws from and extends beyond self-regulated learning through the discussion of technology-mediated learning (Deepwell & Malik, 2008). SDL is defined as a form of study in which learners are given primary responsibility for planning, organising and evaluating their own learning experiences, particularly in online and digital environments (Merriam and Caffarella, 1991). SDL is seen as occurring in both informal and formal learning contexts and common activities include:

- Discussing and collaborating with peers
- Accessing library resources
- Reading
- Researching

- Developing and working through tutorial materials

## **Theme 8: Using online resources and digital technology to facilitate intercultural communication**

Current research points to the importance of developing students' intercultural communication competences to prepare them to "function effectively" in an increasingly globalised and multicultural society (Liu & Alba, 2012). New opportunities and challenges in this area have often been discussed alongside student participation in virtual learning environments. For example, learning online is believed to extend students' global network by introducing them to peers from different linguistic, cultural and participation backgrounds.

Traditionally, courses focused on intercultural communication focused on preparing university students to become effective communicators by emphasising cognitive over affective learning (Millhouse, 1996). Subsequent work in this area expanded intercultural training to introduce the idea of "appropriateness", which shifted the focus from a primarily knowledge-driven acquisition of intercultural communication skills to also include an appreciation of different contextual understandings (cf Liu & Alba, 2012).

It is significant to note that the literature in this field emphasises that simply having students from different linguistic and cultural backgrounds working together online does *not* equate to the development of intercultural communication competencies (cf Kitade, 2011). For example, negative experiences in such situations could reinforce stereotypes or prejudices. Instead, educational research suggests that there are two main areas of curriculum design that help develop students' capacity for intercultural communication: student-centred learning and collaborative learning.

Student-centred learning is seen as promoting students' active engagement in the learning process in order to enhance overall learning (Wilson & Fowler, 2005). Teaching practices associated with student-centred learning are linked to notions of inquiry-based learning or problem-based approaches; these facilitate students' understanding of subject-content through active participation. In these approaches, knowledge is seen as being constructed through interaction with others, rather than through the reception of information. Pedagogies that promote student-centred learning thus encourage constant interaction, activities and inquiry.

In the context of intercultural group work, collaborative learning has been defined as a situation where two or more groups of people attempt to learn something together (cf. Dillenbourg, 1999). It differs from cooperative learning in that cooperative learning is often characterised as task-driven group work in which student are assigned distinct tasks in advance. Collaborative learning, in contrast, requires the group to build "synchronously and interactively" towards a joint solution (Dillenbourg & Schneider, 1995, as cited by Nicholson & Uematsu, 2013). It is generally considered that, in order for collaborative learning to take place, students need to feel that they are part of a "learning community" and the success of a project depends largely on fostering a learning environment that cultivates open communication (Ellis, 2001, as cited by Nicholson & Uematsu, 2013). Ashcraft and Treadwell (2007) posit that the sharing of cultural information among group members (such as values, beliefs and norms) is critical, in that this reduces any reluctance to participate by helping students to feel that they are "insiders" in the group rather than residing in the periphery. This is important in increasing the chances for purposeful and sensitive group



collaboration in online, intercultural contexts, where students come from different countries and bring with them specific social and cultural practices. Ellis (2001) asserts that online collaborative learning can provide students with more “student-centric” experiences than classroom environments. She states that while asynchronous forms of online collaborative learning may lack the immediacy of classroom discussion, they nonetheless still allow for more considered, measured responses.

The technologies used to support such exchanges are rarely novel; rather, established communicative resources are harnessed to communicate in affective, supportive ways with diverse audiences. Technologies that were commonly used in such work include:

- Email correspondence
- Web-based message boards
- Video conferencing
- Wikis and blogs
- Chats

One important subset of intercultural communication studies is “telcollaborative language learning” (O’Dowd, 2007; Dooly, 2008). This specialised area refers to the appropriation of online tools to connect language learners in different countries. Such work emphasises the importance of developing cultural competence through online exchanges with participants from diverse cultural backgrounds, rather than focusing purely on language acquisition. This is to say that online learning immerse students in socially contextualised conversations (O’Dowd, 2007).

## Discussion and implications

The research reviewed in this section has shown the complexity that currently exists in relation to the use of technology to support transitions into Higher Education. Online learning in schools is growing in prevalence but remains relatively novel. Current practice is not sufficiently well established to offer much more than exploratory models, and the rapid uptake of mobile devices has disrupted well-established patterns of educational provision. Technology has several important roles to play as part of the transition into Higher Education; frequently, this is focused on providing information, but orientation through experience is also important.

Technology is also important in the design of materials for use within Higher Education. Considerations here include the creation of resources that support personalisation and differentiation. It is believed that the incorporation of technologies used by young people outside of education can help with this, and that this will also contribute to students’ motivation and support their longer-term employability.

Across all of these areas, reference was made to students’ capacity for self-regulated learning and intercultural communication. The first of these is argued to be developed through pedagogies that promote discussion, interaction and the management of personal goals. Similarly, where such activities create meaningful interactions with

learners from different cultural backgrounds, they can support the development of students' capacity for intercultural communication.

While technology can therefore play an important role in students' transition into and through Higher Education, its value and effectiveness depend greatly on the ways in which it is used by learners and teachers. The next section of this report explores patterns of learners' experiences in the context of pre-tertiary online learning, in order to identify approaches contributed to successful progression.

# Surveying students' patterns of experience

In this section, we report on the survey that was undertaken as part of the project. The respondents to the survey had undertaken online learning in pre-tertiary education and then progressed to University. The purpose of the survey was to provide an overview of their experiences, and to identify and interpret any significant variations within this.

## Methodology

### Questionnaire design

The questionnaire drew from the issues identified in the literature review, and related to the information previously provided by Pamoja Education about their courses. Its purpose was to explore patterns of online learning and respondents' experiences of using technology. These data were then used to compare their pre-university experience with their university experience.

The survey consisted of the following sections:

- Background information (Questions 1-15)
- Patterns of online learning (Questions 16-19)
- Experience of using technology (Questions 20-29)
- Other (contact) information and specific consent requests (Questions 30-35)

Specifically, it asked questions about respondents' background; their current studies; their patterns of pre-tertiary and University study; the self-regulatory actions that they undertook as part of their pre-tertiary and University studies; their experiences of specific technologies; and any issues or experiences that may have helped prepare them for University.

Their background was explored in terms of age; gender; self-declared special educational needs (SEN); country of origin; and language proficiency.

The survey was implemented in SurveyMonkey (premium). Its development was informed by a pilot exercise, undertaken with 4 professionals engaged in online learning.

### The sample

The questionnaire was distributed between 15th April and 5th May 2014 to all International IB alumni who have taken Pamoja Education's online courses. Two reminder letters were sent, and a Facebook campaign was then launched to generate more participants.

Access to the questionnaire was not restricted; however, respondents who were not in the target population (e.g. because they were not currently studying at University) were

excluded through filter questions that thanked them for their interest and then exited the questionnaire.

The majority of respondents were Pamoja Education alumni. Because of issues distributing the survey, it was not possible to reach sufficient numbers of respondents who had taken other IB courses to allow a clear comparison to be drawn between Pamoja Education courses and other modules that form part of the IB pathway. Because of this, caution is advised over generalising from these findings. Whilst the Pamoja Education alumni responses constitute a credible sample of Pamoja Education's graduates, the non-alumni group cannot be assumed to represent a clearly-specified population. Readers are therefore advised to consider the extent to which the demographics reported here reflect their own areas of interest when interpreting the findings of the survey.

For clarity, the final data set consisted of:

- Students who have taken Pamoja Education courses (58)
- Students who have not taken Pamoja Education courses, but have taken other online courses (10)
- Students who have not taken Pamoja Education course nor any other online courses (40)
- Students who did not provide answers to this question (40)

Those who did not provide an answer were excluded from the analysis; comparisons were drawn between students who had taken Pamoja Education courses (58) and those who had not (50), for a total sample size of 108.

As part of their responses, the survey required people to confirm that they were willing for their data to be used for the analysis; only those that explicitly gave consent were included in the dataset. Not all participants completed the survey. For those that did not, their responses were included where possible, with omissions excluded from the analysis on a case-by-case basis, to make optimal use of the data set.

## **Analysis**

The first line of analysis was to provide descriptive statistics that summarise the responses. Where appropriate, given the sample size and data distribution, further statistical analysis was undertaken; given the categorical responses, this consisted almost exclusively of Chi Squared tests (for 2x2 tests of association, Fisher's exact test was used, where appropriate; reported significance values are for two-tailed tests), with other non-parametric tests (e.g. paired Wilcoxon tests and Mann-Whitney tests) being used to draw comparisons for respondents over time.

In some cases the distribution of data meant that responses were spread too thin to permit reliable analysis; in such cases, responses were combined. For example, respondents' ages varied between 17 and 23; for the purpose of reliable testing, respondents were grouped into those aged 17-19 and those 20-23. It should be noted

that there were so few responses for self-declared special educational needs that it was not feasible to analyse these data inferentially. Follow-on research would need to be conducted to explore this issue specifically.

## Respondents' demographics

148 people responded to the survey. 142 (96.6%) of them were university students; the remainder were excluded from the dataset.

120 of these reported their gender; 89 (74%) were female and 31 male. Ages varied from 17 to 23; 47 respondents (39.5%) were aged 19, 33 (27.7%) were 20, and other ages are shown in Figure 1.

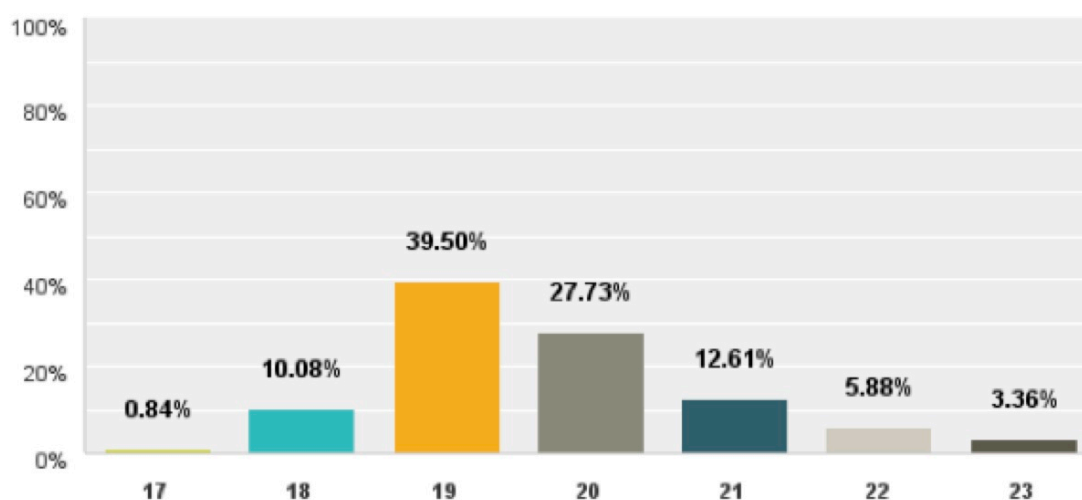


Figure 1: respondents' ages

Among the university students, 57 (47.11%) were in their first year, 45 (31.4%) in their second, 17 (14.05%) in their third, 8 (6.61%) in their fourth and one (0.83) in their sixth year of study (

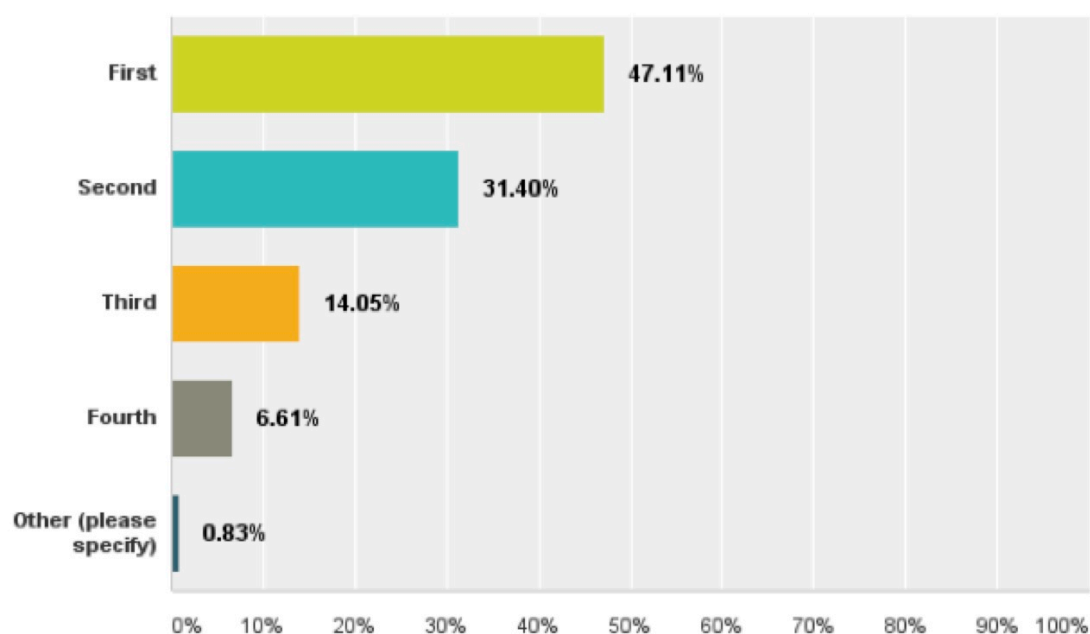


Figure 2).

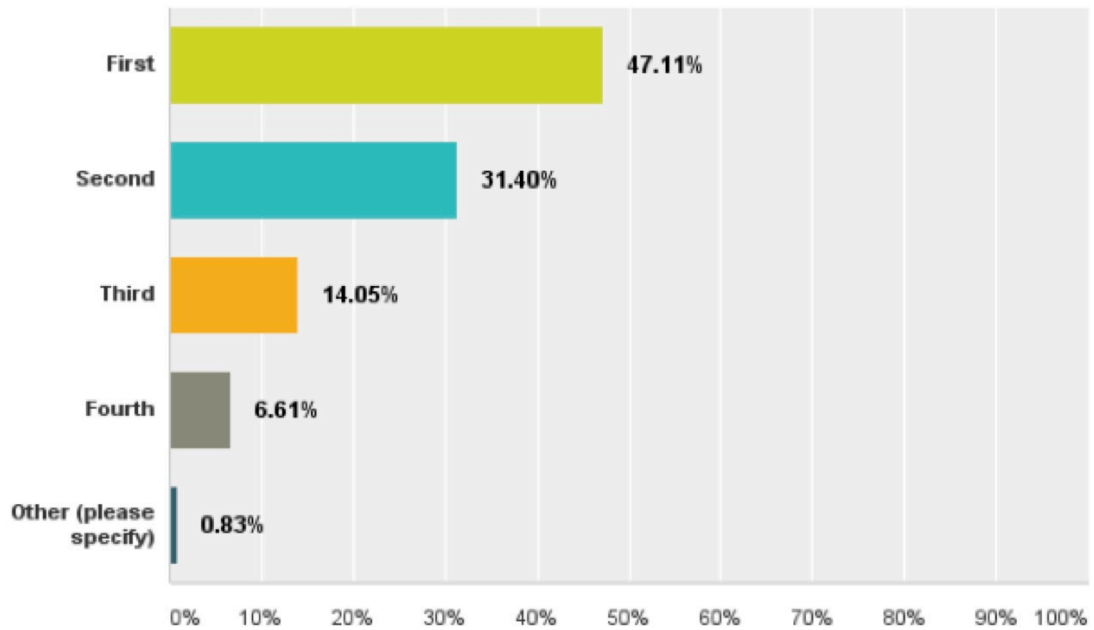


Figure 2: respondents' year of study

The top 10 subjects that the respondents are studying at University are shown in Table 1.

Business	14	12%
Psychology	14	12%
Economics	12	10%
Engineering	12	10%
Science	12	10%
Law	7	6%
Management	6	5%
Biology	6	5%
Communications	5	4%
Mathematics	5	4%

Table 1: most common current degree programmes amongst respondents

The participants are from 36 countries (Table 2). The three largest groups of respondents were from the UK (11.76%), the US (10.92%) and India (8.4%).

GB - United Kingdom	14	11.76%
US - United States	13	10.92%
IN - India	10	8.40%
CA – Canada, HK - Hong Kong	9	7.56%
DE - Germany	8	6.72%
NL - Netherlands	5	4.20%
ES – Spain, IT - Italy	4	3.36%
AT – Austria, AU – Australia, BR – Brazil, FR – France, JP - Japan	3	2.52%
FI – Finland, KR – South Korea, RU – Russia, SG – Singapore, TR – Turkey, ZA – South Africa	2	1.68%
AE - United Arab Emirates, AR – Argentina, BE – Belgium, BW – Botswana, CH – Switzerland, DK – Denmark, EG – Egypt, IS – Iceland, KE – Kenya, MY – Malaysia, NG – Nigeria, RS – Serbia, SE – Sweden, TH – Thailand, TZ – Tanzania, VE - Venezuela	1	0.84%

**Table 2: respondents' country of origin**

Respondents' self-reported first languages are summarised in Table 3. The three largest groups amongst respondents identified as English speakers (50%), German speakers (8.47%), and Spanish speakers (5.93%).

English	59	50.00%
German	10	8.47%
Spanish	7	5.93%
French	6	5.08%
Hindi	5	4.24%
Dutch	5	4.24%
Japanese	3	2.54%
Italian	3	2.54%
Chinese	4	3.39%
Korean	2	1.69%
Portuguese	2	1.69%
Swedish	2	1.69%
Turkish	2	1.69%
Russian	2	1.69%
Arabic	1	0.85%
Danish	1	0.85%
Finnish	1	0.85%
Kiswahili	1	0.85%
Malay	1	0.85%
Serbian	1	0.85%

**Table 3: Respondents' self-reported first language**

Respondents were also asked if they had any special needs that affected their studies. Of the 118 responses to this question, 108 said they did not; five said they had but preferred not to say what these were, and five identified particular needs.

## Respondents' patterns of study

The survey included a series of questions exploring the ways in which respondents studied, both at pre-tertiary level and at university. A series of questions was asked to establish patterns in relation both to location (home, classroom, *etc*) and modality (print, on mobile devices, *etc*).

### Patterns of pre-tertiary study

Respondents most commonly used time in the classroom to work using desktop computers; mobile devices were rarely used. The pattern was repeated in school resource centres and at home, and was similar in public settings (such as cafes or libraries). However, respondents spent much less time studying in resource centres and in public places than in other settings.

Respondents were also asked about study in the workplace, but almost none did this. Only five respondents used print resources at work, two used mobile devices and four used a work desktop computer. They were also asked about studying on public transport; 12 used print-based resources and 10 used mobile devices to study while travelling.



	I didn't do this	1-2 hours	3-6 hours	7-10 hours	More than 10 hours
<i>Use of resources in the classroom</i>					
Using print-based resources	24 (41%)	17 (29%)	8 (14%)	4 (6%)	6 (10%)
Studying using a mobile device	41 (71%)	11 (19%)	3 (5%)	1 (2%)	2 (3%)
Using a desktop computer	20 (32%)	11 (18%)	20 (32%)	6 (10%)	5 (8%)
<i>Use of resources to study in school resource centres</i>					
Using print-based resources	36 (63%)	11 (19%)	9 (16%)	1 (2%)	0
Studying using a mobile device	44 (77%)	8 (14%)	5 (9%)	0	0
Using a desktop computer	24 (41%)	15 (26%)	13 (22%)	5 (9%)	1 (2%)
<i>Use of different resources at home</i>					
Using print-based resources	14 (24%)	17 (29%)	16 (28%)	4 (7%)	7 (12%)
Studying using a mobile device	37 (65%)	11 (19%)	5 (8%)	2 (4%)	2 (4%)
Using a desktop computer	8 (13%)	13 (21%)	22 (36%)	10 (17%)	8 (13%)
<i>Use of different resources to study in public settings</i>					
Using print-based resources	38 (67%)	13 (23%)	4 (7%)	2 (3%)	0
Studying using a mobile device	46 (81%)	7 (12%)	3 (5%)	1 (2%)	0
Using a desktop computer	39 (67%)	12 (21%)	4 (7%)	2 (3%)	1 (2%)

**Table 4: Use of resources to study in different settings at pre-tertiary level**

Reading the tables in terms of means of study, print based resources were most commonly used at home (76% of respondents), followed by classroom use (59%). 21% reported using print resources on public transport.

Similarly, desktop computers connected to the Internet were mainly used at home (87% of respondents) or in classrooms (68%), and were used for longer periods of time.

Interestingly, mobile devices were mainly used for study at home (35% of respondents); they were used just as much in the classroom as in public settings (29%), but only 18% of respondents used them to study on the move. Even when such devices were used, the duration was relatively short, very often reported as being 1-2 hours per week.

Pamoja Education alumni were significantly less likely than expected to make use of print-based resources to study in classrooms ( $\chi^2=20.245$ , 4df,  $p<0.001$ ) or in public venues such as cafes or libraries ( $\chi^2=13.794$ , 3df,  $p<0.003$ ), and more likely than expected to use desktop computers ( $\chi^2=11.256$ , 4df,  $p<0.024$ ) – although this may not be surprising, given the online format of Pamoja Education courses and the fact that the non-alumni included a mix of those who had studied online with other providers and respondents who had followed conventional International Baccalaureate courses. Pamoja Education alumni were also more likely to use mobile devices to study at home than non-alumni, although the size of these differences is small.

Respondents who were in their first year were significantly more likely than expected to report using their mobile to study at home ( $\chi^2=11.496$ , 4df,  $p<0.022$ ) and to use print-based resources whilst travelling ( $\chi^2=6.589$ , 2df,  $p<0.037$ ).

### **Patterns of study at University**

Most respondents used both print and desktop computers to study at home, and around half used mobile devices. A similar pattern was visible for campus-based study, although the use of desktop computers was slightly lower. Around half of students did not study in student halls – possibly because they were not resident in halls. Those that were in halls used a mix of resources, with desktop computers being used for the longest periods of study each week. Around two thirds of students study in public settings such as libraries or cafes, primarily using print resources. This may reflect respondents' use of University libraries.

Few respondents study at work, although a small minority report doing so for several hours each week. Similarly, few study while travelling, and those that do tend to do so quite briefly.

	I didn't do this	1-2 hours	3-6 hours	7-10 hours	More than 10 hours
<i>Use of different resources at home</i>					
Using print-based resources	18 (22%)	25 (30%)	24 (30%)	9 (11%)	6 (7%)
Studying using a mobile device	41 (53%)	20 (26%)	8 (10%)	3 (4%)	5 (7%)
Using a desktop computer	21 (26%)	15 (18%)	20 (24%)	13 (16%)	13 (16%)
<i>Use of resources to study at work</i>					
Using print-based resources	58 (78%)	8 (11%)	6 (8%)	2 (3%)	0
Studying using a mobile device	59 (83%)	11 (16%)	1 (1%)	0	0
Using a desktop computer	57 (80%)	10 (14%)	3 (4%)	1 (2%)	0
<i>Use of different resources on campus</i>					
Using print-based resources	12 (16%)	23 (29%)	32 (40%)	8 (10%)	4 (5%)
Studying using a mobile device	37 (50%)	18 (24%)	11 (15%)	5 (7%)	3 (4%)
Using a desktop computer	26 (33%)	17 (22%)	21 (26%)	11 (14%)	4 (5%)
<i>Use of different resources to study in student halls</i>					
Using print-based resources	37 (49%)	17 (22%)	15 (20%)	5 (7%)	2 (2%)
Studying using a mobile device	52 (72%)	10 (14%)	7 (10%)	1 (2%)	1 (2%)
Using a desktop computer	42 (58%)	8 (11%)	12 (16%)	3 (4%)	8 (11%)

	<i>Use of different resources on public transport</i>				
Using print-based resources	58 (78%)	13 (18%)	2 (3%)	1 (1%)	0
Studying using a mobile device	59 (82%)	12 (17%)	1 (1%)	0	0
	<i>Use of different resources in public settings</i>				
Using print-based resources	29 (38%)	30 (39%)	11 (14%)	5 (7%)	2 (3%)
Studying using a mobile device	49 (70%)	16 (24%)	3 (4%)	1 (1%)	1 (1%)
Using a desktop computer	40 (55%)	17 (23%)	8 (11%)	5 (7%)	3 (4%)

**Table 5: Use of resources to study in different settings whilst at University**

Print resources were most commonly used on campus (84% of respondents) and at home (78%), but were fairly prevalent in all settings. Computers were predominantly used at home (78%) and on campus (67%), as were mobile resources (47% and 50% respectively), although these were less extensively used.

There were differences in the patterns of use of print-based resources on campus between Pamoja Education alumni and other respondents ( $\chi^2=11.259$ , 4df,  $p<0.024$ ; Table 6); Pamoja Education alumni made more light use (1-2 hours) of such resources than expected, with other respondents being more likely than expected to make what they classified as moderate use (3-6 hours).

	<i>Use of print-based resources to study on campus</i>				
	I didn't do this	1-2 hours	3-6 hours	7-10 hours	More than 10 hours
Pamoja Education alumni	6	18	11	6	2
<i>Expected value</i>	6.6	12.7	17.1	4.4	2.2
Non-Pamoja Education respondents	6	5	20	2	2
<i>Expected value</i>	5.4	10.3	13.9	3.6	1.8

**Table 6: uses of print-based resources to study on campus**

While there were significant variations by gender from the expected pattern of desktop computer use at home ( $\chi^2=14.350$ , 4df,  $p<0.006$ ), these were complicated, and did not suggest any obvious reasons for the variation (Table 7).

	Use of desktop computers for study at home				
	I didn't do this	1-2 hours	3-6 hours	7-10 hours	More than 10 hours
Female <i>Expected value</i>	16 16.4	9 11.7	19 15.6	7 10.1	13 10.1
Male <i>Expected value</i>	5 4.6	6 3.3	1 4.4	6 2.9	0 2.9

**Table 7: gendered patterns of use of desktop computers at home, for University study**

There were also differences by age in the way that print-based resources were used on campus, with older students spending more time studying with these than younger students ( $\chi^2=9.548$ , 4df,  $p<0.049$ ).

Participants' responses were given in terms of ranges of times allocated to activity. Using the lower ends of these ranges (in order to be sure to arrive at a conservative estimate), comparisons were made about the total amounts of time that respondents spent studying each week.

Respondents reported studying for around five hours longer at University than before (mean pre-tertiary: 18.8 hours/week; mean at University: 23.9 hours). However, respondents were consistent in their pattern of study, in that they spent more time using desktop computers to support their study than they do using print resources, and less time using mobile devices.

	Pre-tertiary	University
Using desktop computers	8.8	9.8
Using print resources	6.9	9.4
Using mobile devices	3.1	4.7

**Table 8: mean number of hours reported studying with different resources per week**

Paired Wilcoxon tests indicated that the increase in use of print resources was significant ( $Z=1.958$ ,  $p<0.05$ ), as was the use of mobile devices ( $Z=2.428$ ,  $p<0.015$ ) and the total time spent studying ( $Z=2.361$ ,  $p<0.018$ ), but that the increase in use of desktop computers was not.

Similarly, the places where respondents studied remained fairly consistent.

	Pre-tertiary	University
School (class / resource centre), or campus	8.5	10.9
Home	7.4	7.4
Public locations	1.9	3.4
On public transport	0.5	0.7
In work	0.4	1.1

**Table 9: mean number of hours reported studying in different locations per week**

Paired Wilcoxon tests indicated that none of these increases was statistically significant except for studying in public locations ( $Z=2.565$ ,  $p<0.01$ ), which may reflect the increased use of University libraries noted above.

Mann-Whitney tests comparing responses from Pamoja Education alumni and other respondents indicated several significant differences; however, most of these involved

small sample sizes and were unreliable, and so are not reported. The two significant results with an adequate sample size were for the total time reported for studying each week whilst at University ( $U=376$ ,  $p=0.031$ ,  $r=0.26$ ), and for the component of this that involved studying at home ( $U=484.5$ ,  $p=0.036$ ,  $r=0.24$ ). In both cases, Pamoja Education alumni reported spending less time studying (in total, and at home) than other respondents.

Paired Wilcoxon tests showed no significant differences in patterns of study by gender, except for studying with print-based resources at pre-tertiary level ( $Z=2.371$ ,  $p<0.018$ ) and studying in public locations during their University courses ( $Z=3.115$ ,  $p<0.002$ ); in both cases, female respondents reported spending more time studying in these ways than the male respondents.

## Self-regulation

### Self-regulation in pre-tertiary courses

Respondents were asked to describe the extent to which they undertook a series of self-regulatory behaviours identified from the literature review. 78 participants answered the question.

Before entering university, more than 50% of respondents set their own goals in their study. About 40% of them were aware of what constitutes a good environment and structure for their study. Most respondents (65%) took notes as part of their studies, but fewer (22%) worked on additional issues in order to master the course content, and only 14% said that they prepared questions before joining course discussions. Only 17% of respondents said that they tried to schedule regular times for their studies. 36% said that they allocated individual study time in addition to the scheduled sessions. When in need of help, most would either turn to their instructor (71%) or just try to solve their problems by themselves (63%). Relatively few (40%) shared their problems with their classmates. When asked how they evaluated their own performance, the most popular response was by comparison with their classmates (55%).

	<b>Definitely</b>	<b>A little</b>	<b>Not really</b>
I set goals to help me manage studying time for my courses	40 (51%)	28 (36%)	10 (13%)
I set standards for my assignments in courses	42 (54%)	28 (36%)	8 (10%)
I know where I can study most efficiently for courses	38 (49%)	30 (38%)	10 (13%)
I know when I can study most efficiently for courses	32 (42%)	31 (40%)	14 (18%)
I take notes for my courses	51 (65%)	18 (23%)	9 (12%)
I prepare my questions before joining in course discussion	11 (14%)	22 (28%)	45 (58%)
I work on extra issues in my courses in addition to the assigned ones to master the course content	17 (22%)	21 (27%)	39 (51%)
I try to schedule the same time every day or every week to study for my courses, and I observe the schedule	11 (17%)	22 (34%)	32 (49%)
I allocate extra individual study time for the course in addition to the scheduled sessions	23 (35%)	23 (35%)	19 (30%)
I share my problems with my classmates	26 (40%)	28 (43%)	11 (17%)
I get help from the instructor when I have problems	46 (71%)	13 (20%)	6 (9%)
I try to solve my problems by myself	41 (63%)	23 (35%)	1 (2%)
I ask myself a lot of questions about the course material	22 (35%)	23 (36%)	18 (29%)
I compare my performance with my classmates to find out how I am doing in my classes	35 (55%)	23 (36%)	6 (9%)
I summarise what I have learned in my online course to assess the progress I have made	21 (33%)	19 (30%)	23 (37%)

**Table 10: Respondents' pre-tertiary self-regulatory behaviours**

Pamoja Education alumni reported being more likely than expected to summarise what they had learnt on their pre-tertiary courses ( $\chi^2=7.302$ , 2df,  $p<0.026$ ), with non-Pamoja Education respondents being less likely.

However, Pamoja Education alumni were less likely than expected to be certain they would take notes for their courses, whereas non-Pamoja Education respondents were more sure than expected that they would do this ( $\chi^2=6.679$ , 2df,  $p<0.035$ ), as shown in Table 11.

	I take notes for my courses (pre-tertiary)			
	Not really	A little bit	Definitely	Total
Pamoja Education alumni	8	12	24	44
<i>Expected value</i>	5.2	9.8	28.9	
Non-Pamoja Education respondents	1	5	26	32
<i>Expected value</i>	3.8	7.2	21.1	

**Table 11: a comparison of responses from Pamoja Education alumni and others about note taking**

Female respondents were more definite than their male counterparts that they knew the best places to study ( $\chi^2=8.98$ , 2df,  $p<0.011$ ). Female respondents appeared to be more confident than males about sharing problems with their classmates, although this was not significant ( $\chi^2=5.877$ , 2df,  $p<0.053$ ). Male respondents reported being more likely to try and solve problems by themselves ( $\chi^2=6.805$ , 2df,  $p<0.033$ ).

Although it was not significant, respondents in the second year or above seemed more confident that they set standards for their assignments in their pre-tertiary courses ( $\chi^2=5.905$ , 2df,  $p<0.052$ ). Similarly, whilst it was not significant, older respondents seemed more likely to report that they asked themselves questions about their course materials at pre-tertiary level than younger respondents ( $\chi^2=5.874$ , 2df,  $p<0.053$ ).

The number of respondents declaring special educational needs was too small to permit meaningful comparisons, but the handful of respondents who did report having such needs appeared to be less likely than others to contact an instructor when they had problems. This may warrant further investigation.

### **Self-regulation in University education**

The patterns of self-regulatory behaviours that respondents reported increased greatly from pre-tertiary to University study (Table 12).

Respondents' efficiency and time management skills appear markedly improved, including their use of goal setting to manage their studies; their commitment to setting standards to assess their work; and the selection of appropriate study environments and times.

Students' study strategies (such as note-taking, wider work on issues, questioning the course material and summarising what they have learnt) also seem to have improved, although to a lesser degree. They report allocating extra individual study time for the course. They also report a change in patterns of collaboration with peers: far fewer seek help from their instructors, whereas they are more likely to share their problems with their classmates or to try to solve problems by themselves. Moreover, fewer report that they compare their performance with classmates to find out how they are doing in their classes.



	<b>Definitely</b>	<b>A little</b>	<b>Not really</b>
I set goals to help me manage studying time for my courses	51 (67%) - up 16%	21 (28%)	4 (5%)
I set standards for my assignments in courses	48 (63%) - up 9%	23 (30%)	5 (7%)
I know where I can study most efficiently for courses	59 (78%) - up 29%	14 (18%)	3 (4%)
I know when I can study most efficiently for courses	42 (56%) - up 14%	27 (36%)	6 (8%)
I take notes for my courses	52 (68%) - up 2%	21 (27%)	4 (5%)
I prepare my questions before joining in course discussion	15 (20%) - up 5%	28 (37%)	33 (43%)
I work on extra issues in my courses in addition to the assigned ones to master the course content	21 (28%) - up 6%	32 (42%)	23 (30%)
I try to schedule the same time every day or every week to study for my courses, and I observe the schedule	14 (22%) - up 5%	19 (29%)	32 (49%)
I allocate extra individual study time for the course in addition to the scheduled sessions	32 (50%) - up 15%	19 (30%)	13 (20%)
I share my problems with my classmates	32 (49%) - up 9%	27 (42%)	6 (9%)
I get help from the instructor when I have problems	28 (43%) - down 28%	29 (45%)	8 (12%)
I try to solve my problems by myself	51 (78%) - up 15%	13 (20%)	1 (2%)
I ask myself a lot of questions about the course material	35 (56%) - up 21%	20 (32%)	8 (12%)
I compare my performance with my classmates to find out how I am doing in my classes	31 (48%) - down 6%	21 (33%)	12 (19%)
I summarise what I have learned in my online course to assess the progress I have made	28 (44%) - up 11%	11 (17%)	24 (38%)

**Table 12: Respondents' self-regulatory behaviours in their University courses**

Pamoja Education alumni reported being less likely than their counterparts to turn to instructors for help with problems at University ( $\chi^2=6.242$ , 2df,  $p<0.044$ ).

Female respondents were more definite than their male counterparts that they would compare their performance to their peers in order to find out how they were doing ( $\chi^2=7.149$ , 2df,  $p<0.028$ ). Interestingly, there was no evidence that the gendered patterns of interaction with peers noted at the pre-tertiary level (females sharing problems with peers, males pursuing problems individually) persisted into their University studies.

First year respondents were more likely than expected to say that they summarised what they had learnt ( $\chi^2=7.711$ , 2df,  $p<0.021$ ), and there was a similar tendency in terms of asking questions of the materials, although this was not significant ( $\chi^2=5.543$ , 2df,  $p<0.063$ ).

## Self-regulation as preparation for University

Respondents were asked to say how important they felt it was to practice each of the self-regulatory behaviours as a way of preparing for their University studies. The majority were confident that goal-setting, standards-setting, taking notes and choosing the right time and place for studying are important (Table 13). Private study, individual problem-solving, seeking the instructor's help and also summarising findings are all considered important ways of preparing for University study. The least important forms of preparation were thought to be questioning the course materials, preparing questions before joining course discussions and comparing performance with classmates.

	<b>Definitely</b>	<b>A little</b>	<b>Not really</b>
I set goals to help me manage studying time for my courses	63 (84%)	8 (11%)	4 (5%)
I set standards for my assignments in courses	54 (71%)	18 (24%)	4 (5%)
I know where I can study most efficiently for courses	55 (73%)	14 (19%)	6 (8%)
I know when I can study most efficiently for courses	52 (71%)	12 (17%)	9 (12%)
I take notes for my courses	54 (70%)	15 (20%)	8 (10%)
I prepare my questions before joining in course discussion	29 (38%)	25 (33%)	22 (29%)
I work on extra issues in my courses in addition to the assigned ones to master the course content	33 (44%)	25 (33%)	17 (23%)
I try to schedule the same time every day or every week to study for my courses, and I observe the schedule	26 (41%)	27 (42%)	11 (17%)
I allocate extra individual study time for the course in addition to the scheduled sessions	37 (59%)	17 (27%)	9 (14%)
I share my problems with my classmates	31 (48%)	16 (25%)	18 (28%)
I get help from the instructor when I have problems	44 (68%)	13 (20%)	8 (12%)
I try to solve my problems by myself	50 (78%)	12 (19%)	2 (3%)
I ask myself a lot of questions about the course material	22 (35%)	23 (36%)	18 (29%)
I compare my performance with my classmates to find out how I am doing in my classes	25 (39%)	14 (22%)	25 (39%)
I summarise what I have learned in my online course to assess the progress I have made	32 (51%)	13 (21%)	18 (29%)

**Table 13: respondents' claims about which self-regulatory behaviours constitute important preparation for University work**

Pamoja Education alumni were less sure than other respondents that learning to take notes on course materials was useful preparation for University study ( $\chi^2=8.281$ , 2df,  $p<0.016$ ; Table 14).

	I take notes for my courses (as preparation for University)			
	Not really	A little bit	Definitely	Total
Pamoja Education alumni	7	11	26	44
<i>Expected value</i>	4.1	8.8	31.1	
Non-Pamoja Education respondents	0	4	27	31
<i>Expected value</i>	2.9	6.2	21.9	

**Table 14: a comparison of responses from Pamoja Education alumni and others about the value of note taking as preparation for University study**

Similarly, Pamoja Education alumni were less convinced by the value of wider working in addition to the assigned tasks in order to master the course content ( $\chi^2=9.162$ , 2df,  $p<0.010$ ; Table 15).

	I work on extra issues in my courses in addition to the assigned ones to master the course content (as preparation for University)			
	Not really	A little bit	Definitely	Total
Pamoja Education alumni	14	17	13	44
<i>Expected value</i>	10.1	14.9	19	
Non-Pamoja Education respondents	3	8	19	30
<i>Expected value</i>	6.9	10.1	13	

**Table 15: a comparison of responses from Pamoja Education alumni and others about the value of wider problem solving as preparation for University study**

They were also were less convinced by the value of seeking help from an instructor when faced with problems ( $\chi^2=10.357$ , 2df,  $p<0.006$ ; Table 16).

	I get help from the instructor when I have problems (as preparation for University)			
	Not really	A little bit	Definitely	Total
Pamoja Education alumni	7	11	21	39
<i>Expected value</i>	4.9	7.3	26.8	
Non-Pamoja Education respondents	1	1	23	25
<i>Expected value</i>	3.1	4.7	17.2	

**Table 16: a comparison of responses from Pamoja Education alumni and others about the value of wider problem solving as preparation for University study**

No other significant associations were found between demographic categories and the perceived value of self-regulatory behaviours.

## Experiences using technology

The questionnaire asked in detail about specific ways in which technologies were used to support studying, drawing individual items from the literature review.

Interestingly, the predominant pattern was that respondents are making *less* use of technology in their University study than they did at the pre-tertiary level. There were, for example, particularly sharp drops reported in terms of taking part in live online lessons, creating multimedia resources, writing on blogs and using self-assessment tools.

Modest increases were reported in relation to the use of virtual learning environments to access course resources, and in finding academic resources on the Internet; in addition planning and coordinating group tasks increased by 10%.

	Used at pre-tertiary level	Used informally, outside education	Used now, as part of University studies	Change
Using the Virtual Learning Environment (VLE) to get access to course materials	43 (70%)	19 (31%)	45 (74%)	+4%
Finding academic resources on the Internet	57 (88%)	35 (54%)	58 (89%)	+2%
Taking part in live online lessons (involving audio, chat and /or shared whiteboards)	32 (70%)	14 (30%)	13 (28%)	-41%
Using news feeds to stay up to date on topics	33 (65%)	32 (63%)	28 (55%)	-10%
Using blogs to develop my own thinking on a topic	28 (56%)	26 (52%)	13 (26%)	-30%
Planning and coordinating group tasks using calendar, scheduling and discussion applications	38 (63%)	24 (40%)	44 (73%)	+10%
Using asynchronous discussion tools (e.g. an online forum) to discuss with peers	36 (73%)	16 (33%)	22 (45%)	-28%
Building relationships with other learners using social networks	36 (69%)	28 (54%)	30 (58%)	-11%
Using Instant Messenger (or similar synchronous text chat) to work informally with others	48 (81%)	42 (71%)	44 (75%)	-6%
Asking the teacher/ tutor questions by email or through the VLE	53 (85%)	15 (24%)	47 (76%)	-9%
Using Wikis or other online editing tools (e.g. Google Docs) to create shared materials	47 (80%)	21 (36%)	38 (64%)	-16%
Using audio visual tools to create images, podcasts or video for the course	44 (85%)	16 (31%)	26 (50%)	-35%
Using audio or video resources (e.g. podcasts, recorded lectures) to prepare for tests or exams	39 (76%)	14 (27%)	36 (71%)	-5%
Using learner-authored Wikis or similar resources (e.g. Blogs or Google Docs) to prepare for tests or exams	29 (67%)	9 (21%)	22 (51%)	-16%
Using online self-assessment tools to test my own learning	41 (77%)	15 (28%)	25 (47%)	-30%

Table 17: respondents' use of technologies to support their studies

Unsurprisingly, Pamoja Education alumni were more likely to have used Virtual Learning Environments than non-alumni respondents in their pre-tertiary studies (Fisher's exact test,  $p < 0.001$ ), although seven Pamoja Education alumni (out of 41) said that they hadn't

done this. It is possible this reflects a lack of familiarity with the terminology rather than the technology, although this would need to be confirmed by new data. Pamoja Education alumni were also more likely to have experienced:

- live online lessons (Fisher's exact test,  $p < 0.000$ ), although 12 Pamoja Education alumni said that they hadn't done these;
- blogs (Fisher's exact test,  $p < 0.010$ ), although 18 Pamoja Education alumni said that they hadn't used them;
- online discussion forums (Fisher's exact test,  $p < 0.000$ ), although 11 Pamoja Education alumni said that they hadn't used them;
- the use of audio or video resources for revision (Fisher's exact test,  $p < 0.038$ ), although 12 Pamoja Education alumni said that they hadn't used these; and
- the use of learner-authored resources (Fisher's exact test,  $p < 0.008$ ), although 17 Pamoja Education alumni said that they didn't use these.

Female respondents were more likely to have taken part in live classrooms at the pre-tertiary level (Fisher's exact test,  $p < 0.005$ ). They were, however, less likely than expected to be using social networking currently as part of their studies, whereas males were more likely to report doing so (Fisher's exact test,  $p < 0.008$ ). Similarly, they were less likely than expected to use self-assessment to test their learning, whereas males were more likely (Fisher's exact test,  $p < 0.006$ ).

First year students were more likely to have experienced live synchronous classrooms at the pre-tertiary level (Fisher's exact test,  $p < 0.025$ ); this could reflect the growing use of this technology, or be associated with numbers of Pamoja Education alumni within the first year population. The same pattern repeated for respondents' use of news feeds in contexts outside of education, suggesting that this is an increasingly prevalent experience for young people in general (Fisher's exact test,  $p < 0.006$ ).

Unsurprisingly, similar patterns emerged in relation to age, with 17-19 year old respondents being more likely than 20-23 year olds to have experienced live classrooms at the pre-tertiary level (Fisher's exact test,  $p < 0.002$ ), to have made use of blogs within education (Fisher's exact test,  $p < 0.005$ ) and to have used audio or video resources for revision (Fisher's exact test,  $p < 0.041$ ). Similarly, they reported higher than expected levels of use of Instant Messenger in informal situations than 20-23 year olds, again suggesting the wider uptake of this within youth culture (Fisher's exact test,  $p < 0.020$ ).

In addition to describing the uses that they had made of different technologies in their studies, respondents were also asked to indicate whether they thought that experiencing these kinds of technology use at a pre-tertiary level helped to prepare people for University (Table 18). The greatest consensus was on the value of finding academic resources on the Internet; however, there were several inconsistencies between these perceived priorities and the patterns of technology use at University described in Table 17. For example, social networking is perceived as useful preparation, but 11% fewer respondents report using it at University than in their pre-tertiary studies; using the virtual

learning environment to access course materials is seen only as moderately useful preparation, but is used by 74% of respondents at University, up 4% on pre-tertiary levels.

	Doing this before university helps prepare people for University life
Finding academic resources on the Internet	61 (94%)
Planning and coordinating group tasks using calendar, scheduling and discussion applications	47 (78%)
Building relationships with other learners using social networks	37 (71%)
Using Wikis or other online editing tools (e.g. Google Docs) to create shared materials	40 (68%)
Asking the teacher/ tutor questions by email or through the VLE	41 (66%)
Using audio or video resources (e.g. podcasts, recorded lectures) to prepare for tests or exams	32 (63%)
Using news feeds to stay up to date on topics	31 (61%)
Using the Virtual Learning Environment (VLE) to get access to course materials	35 (57%)
Using online self-assessment tools to test my own learning	30 (57%)
Using Instant Messenger (or similar synchronous text chat) to work informally with others	33 (56%)
Using audio visual tools to create images, podcasts or video for the course	28 (54%)
Using asynchronous discussion tools (e.g. an online forum) to discuss with peers	26 (53%)
Using learner-authored Wikis or similar resources (e.g. Blogs or Google Docs) to prepare for tests or exams	20 (47%)
Taking part in live online lessons (involving audio, chat and /or shared whiteboards)	21 (46%)
Using blogs to develop my own thinking on a topic	21 (42%)

**Table 18: the perceived usefulness of different technologies as preparation for University, ranked by percent of respondents who agreed**

There were no significant demographic differences across these responses.

## Successful uses of technology

Participants were asked to provide descriptions of specific uses of technology that helped them to study at University, and to explain why these were helpful. 47 participants responded to this question.

A wide range of resources was identified. The most prevalent was a laptop with Internet access (11 responses), followed by institutional Virtual Learning Environments (either Blackboard or Moodle; 9 responses). Others included online library catalogues such as JSTOR; Google Docs; online videos (particularly recordings of lectures); teachers' slides from lectures; online quizzes or practice questions; online learning materials; specialist software (including CAD, anatomy identification apps and flashcard software); and the unhelpfully general answer, "computers".

However, prevalence of technologies alone is not particularly useful to know, since the same technology can be used in several different ways. Laptops, for example, were used to access course resources and online materials; search the Internet; take notes; record lectures; manage files; log and analysing data; write assignments; create presentations; upload resources to file sharing sites; and communicate with teachers and peers. At the same time, other technologies were used to achieve the same ends; so, for example, access to course resources was achieved using computers, iPads and kindles.

These responses were categorised in relation to the kinds of study practice they supported. These categories are presented below. As can be seen, technologies are used extensively; as one respondent noted, “Technology helps me in each step of the learning process, whether it be preparing or presenting work.”

### **Searching for materials**

Respondents described using technology to search for academic articles; journals; citations and references; answers to specific questions (“usually Wikipedia”); apps; and other “information”.

### **Access**

The majority of responses were about access. Although there was some variety in terms of what was being accessed, broadly, responses concerned using Virtual Learning Environments as the single point of access for course materials and information – in other words, managing multiple kinds of access.

*“Blackboard helps me access my grades, online class forums, lectures and tutorials, as well as homework.”*

Responses commonly referred to course readings; lecture slides and other tutor-produced materials; grades and feedback; self-assessment activities; and timetabling information. There was also mention of using the Virtual Learning Environment to submit assignments.

Outside of the Virtual Learning Environment, participants reported accessing academic articles via library portals, and of using laptops to access the Virtual Learning Environment. There was also mention of cloud-based services to provide “easy access to my presentations and files without having to keep a thumb drive.”

### **Reading/watching**

Several kinds of reading or watching practices were described, all of which involved finding information or contributing to the learner’s understanding of the course. These included both conventional sources such as books but also video explanations.

*I find education videos on youtube very helpful, especially if they are animated and done in less than 5 minutes just to get the big picture of what the topic is really about.*



Video explanations were considered faster than reading, and “sometimes even more updated than what the book or readings I have to do says”.

What was most interesting about these responses was the way in which different kinds of reading or watching practice were used to shore each other up.

*Besides my books, I use technology to understand concepts that the book was not clear enough for.*

## **Production**

Respondents described using technology to make a wide variety of things as part of their courses. The most obvious of these was writing their assignment, but other responses included making notes, recording lectures, undertaking projects, writing research papers, making tables and charts, programming software, logging and processing data, and finally, submitting their work for assessment.

## **Communication**

A small number of comments mentioned using technology to communicate, both with peers and tutors. Interestingly, one comment pointed out how such communication could support discussion of sensitive issues:

*Enables more fluid class discussion and far more ideas are shared because things can be communicated anonymously. We have used it to identify themes in films and literature, as well as for issues that are more sensitive, such as race and sexuality.*

## **Collaboration**

Respondents talked about several different ways in which they used technology to facilitate collaboration, either during the process of production or by sharing the outputs of their work. One obvious example of this was via shared online documents:

*I often use Google Docs and other Google tools to collaborate on group projects, including working with teams that are in different locations and time zones.*

Other examples involved simply sharing completed work, such as presentations or collected data.

Some of these benefits were only recognised once the respondent had begun to work in this way – in other words, for some people, the value of collaboration only becomes apparent through participation.

*It was initially used in class by the tutor, but I now understand the benefit of it, such that I use it with peers as well.*

## Efficiency

Students described how technology-supported activities were more efficient for them in several different ways. Some responses were very general, just describing these practices as “better” or more efficient. Others were more specific, focusing on qualities such as:

- speed (“it’s also the fastest way to obtain information”),
- convenience (“[cloud storage] enables easy access to my presentations and files without having to keep a thumb drive”; “has the software integrated into it (such as voice recording, text editing etc). It also has tagging ability and notebooks as well as apps for all my devices”),
- cost (“kindle version of books are cheaper”),
- appearance (“It’s a visual and fun way for me to learn”),
- versatility (“My project, research paper, online book, assignments...etc are all accessed and done from my laptop”), and
- being an aid to organisation (“Skype and Google Docs are also immensely useful to coordinate group activities”).

## Scheduling

University study is complex; several responses focused on the role technology can play in helping to organise and manage it. Most frequently, this involved checking course timetables, usually through the Virtual Learning Environment; other activities included checking course news and announcements, checking daily for updates, looking for updates on coursework, checking on exam and assignment deadlines, etc.

*Need to keep track of lecture content, keep up to date on exam/assignment deadlines, tutorial content, learning resources and quizzes.*

## Revision

Several comments concerned revision practices. These focused primarily on the management of and convenient access to course materials, but also included generating new notes, and opportunities for self-testing.

*Before exams the revision material is easily accessible through moodle.  
Practice quizzes especially help you to identify topics that you need to revise more.*

## Necessity

Further comments said that technology use was unavoidable, and that they used the technology they had picked as an example because “I have to” or because “it is

required". Few explained why or how this requirement worked, although one pointed to the coordinating function their laptop served for them:

*I have to use it. All of my homework, class work and schedule are on it.*

## Technology use as preparation for University

Respondents were asked to describe the ways in which their pre-tertiary online studies helped to prepare them for University work. 37 provided answers to this question. Of these, 5 were excluded as irrelevant (e.g. "I did not study courses online"); 1 was positive but lacked any specificity (this simply said, "did."); and 2 were negative, saying that their previous experiences *had not* helped prepare them, but not explaining why (e.g. "it didn't help").

The remaining comments were grouped thematically, as follows.

### Independence

Several comments described being self-motivated and able to take responsibility for one's own learning.

*Working with Pamoja Education, I had to be independent and in charge of my own learning so this has helped me be able to work this way.*

*Studying online is different from attending regular class. You have to be self-motivated to study on your own and set your own deadline. Personally, I learned a lot from taking an online course because it help me prepare myself in terms of scheduling and allocating time to finish each of the subject that I am currently taking*

### Time management

Similarly, respondents reported that studying online helped with time management. Linked to the previous comments, this suggests that pre-tertiary online learning provides an opportunity for people to practice their time management, because undertaking such courses requires them to do this.

### Familiarity

12 responses suggested, in different ways, that their pre-tertiary online learning had made them familiar either with "the whole concept" of online learning, or with specific tools, sites and processes. It was suggested by one respondent that University students who lacked this familiarity "sometimes struggle".

*We used similar things.*

*Building familiarity by using online learning tools prior to commencing university.*

## Practice

Another frequent comment, which develops those described already, was that the pre-tertiary experience allowed a kind of rehearsal space. This meant that people could develop their approaches to study, including note-taking, information searching and communicating online (with peers and teachers).

*I was able to learn how to make efficient notes in a short space of time, whilst concentrating.*

One respondent suggested that this expertise made them stand out from their peers.

*I could use the IB business textbook my first year of university still, which was really helpful for the first exam on management. But just working online and using different tools such as prezis is something still not so common, and if done the right way, you can really impress your professors and clients of companies.*

## Problematic uses of technology

Respondents were asked to identify a technology that they were required to use, but did not like using. 32 participants answered this question, although of these responses, 10 simply said that there were none that they didn't like to use.

The remaining 22 answers identified a range of different technologies that were experienced as being problematic. Five said that they had problems with online discussion forums; four with a Virtual Learning Environment; three with the institution's online library service; two with reading materials online; two with institutional resource databases; and one each for Prezi, Peerwise, online lecture recordings, electrical measuring instruments, blogs, and "the computers at the Uni".

Obviously, the reasons why these were problematic varied, depending on what it was that students were trying to do. However, broadly, most (eight of these) suggested that the particular technologies were unnecessarily complicated or poorly designed.

*Unfortunately it is horrible organised and extremely inefficient. Moodle is the bottleneck in my workflow and eats up the most time.*

Problems with forums were different, however; these were mostly explained in terms of the delays associated with getting a reply (from other students or the tutor); that there was no quality assurance of the answers provided by peers; that the volume of postings could be overwhelming; and one respondent suggested that they simply did not read these properly.

*I don't always find it helpful, as I tend to skim over what people have written.*

Other students also expressed problems with online discussions, justifying their position by comparing it to face-to-face interaction.

*I actually like almost everything about Blackboard, but I don't like the way that everything is being done online because of it. I like paper and face-to-face interaction. Arts degrees are giving students less and less time with their tutors.*

*It seems unnecessary. Why not just have a discussion?*

## Difficulties studying online

Respondents were invited to identify any problems that they encountered when studying online. 61 students answered this question, and the majority of them had experienced difficulties. Table 19 shows the problems that they identified, in order of prevalence.

Technical problems (e.g. inadequate technical support, reliability of internet connection)	51 (84%)
Low participation by the other students	29 (48%)
Problems accessing the online materials (e.g. no computer for you to use)	26 (43%)
Finding the technology distracting or disengaging	26 (43%)
Lack of support from a school-based coordinator	23 (38%)
Feeling that technology encourages dependency, spoon feeding or superficial learning	17 (28%)
Lack of support from an online teacher	12 (20%)
Concerns about privacy and safety over online postings	8 (13%)
Others (please specify)	4 (7%)

**Table 19: Difficulties studying online**

The 'other' option elicited four responses; one simply said "only lightly", one focused on bad web design, one on finding using computers in general distracting, and one concerned computers' inability to interpret free-text responses:

*Computers are incapable of analysing whether an answer is correct for online assessments. If the wording or sometimes even the failure to use capitals deviates from pre-programmed answers, it is rejected. Overall a very inflexible method for assessment and does not promote learning. Frustration ensues.*

Pamoja Education alumni were more likely than other respondents to report having had problems with low participation from other learners (Fisher's Exact Test,  $p < 0.017$ ); it is possible that this is because only a subset of the non-respondents have studied online, and so their non-response may reflect lack of experience rather than that their experience was more positive. Pamoja Education alumni were also less likely than expected to have concerns about privacy or safety (Fisher's Exact Test,  $p < 0.045$ ).

Female respondents were more likely than males to report having experienced technical problems (Fisher's Exact Test,  $p < 0.041$ ), whilst male respondents were more likely to have experience a lack of support from an online teacher (Fisher's Exact Test,  $p < 0.022$ ).

First year respondents were more likely than those from the second year or later to have experienced problems with low levels of participation from other students (Fisher's Exact

Test,  $p < 0.021$ ); this was echoed in relation to age, with 17-19 year olds being more likely to report this issue than 20-23 year old respondents (Fisher's Exact Test,  $p < 0.040$ ).

Following on from this question, respondents were invited to identify anything that could have been provided during the IB diploma programme that would have helped them to deal with the challenge. Responses are shown in Table 20, in order of prevalence (with "fairly" or "very" helpful responses combined).

Clarifying expectations in terms of the academic and social dimensions of the university experience	41 (89%)
Collaboration by schools, colleges, guidance organisations, the community and workplaces in enabling prospective students to make appropriate choices of programme and institution	40 (87%)
Targeted and timely website guidance	35 (74%)
Taster packs or taster experience	29 (63%)
Summer school provision	28 (62%)

Table 20: Approaches that could help prepare people to study online

Only one respondent provided additional information about their response:

*I wasn't told I had been enrolled in an online course (and that it was the only option) until two or three weeks into the academic year. Before that, no answers from the school. This is unacceptable, but not a fault of Pamoja Education's.*

## Conclusions

Patterns of study at pre-tertiary level are relatively simple, consisting primarily of print-based resources and use of desktop computers either in the classroom or at home, with Pamoja Education alumni being more likely than other respondents to have used desktop computers as part of their studies. Mobile devices were used by a substantial minority of respondents, mainly whilst at home.

At University level, patterns of study are more complex, making more use of public settings, more use of mobile devices, and involving longer hours of study. Print resources were mainly used on campus and desktop computers at home. Pamoja Education alumni make slightly less use of print-based resources.

Respondents reported that University study requires more self-regulatory behaviour than pre-tertiary study, particularly in areas such as time management. Interestingly, however, fewer respondents reported comparing their performance to peers or getting help from the instructor at University than at pre-tertiary level. Most respondents believed that goal-setting, independent problem-solving, standards-setting, knowing where and when to study, and asking for help from the instructor were important as preparation for University study. Pamoja Education alumni were less convinced of the value of note taking, extra-curricula study or turning to an instructor for help as part of their University studies. Some gendered differences were visible at the pre-tertiary level (female respondents being more confident about knowing the most productive places to study; males being more likely to try and solve problems independently) but these did not

persist into University study, although female respondents were more likely to compare their performance with their peers.

Respondents reported less use of technology at University than at pre-tertiary level, particularly in relation to the use of live online lessons, creating multimedia resources, writing on blogs and using self-assessment tools; there were however modest increases in the use of Virtual Learning Environments, searching for academic resources online, and coordinating group work. This is likely to reflect the move from studying online (primarily as part of Pamoja Education courses) into University courses that make use of technology primarily to support face-to-face study. However, almost all respondents thought that technology use was important as preparation for University study, particularly: finding academic resources online; coordinating group work; building relationships via social networks; discussing questions with the tutor; and using multimedia resources for revision.

Pamoja Education alumni were more likely than other respondents to have experienced a wide range of technologies. Male respondents were more likely to use social networking as part of their studies and to use self-assessment to test their learning; female respondents were more likely to report having taken part in live online lessons. There were also patterns that suggest growing use of technology (live online classes, blogs, audio-visual resources for revision) amongst younger learners, although this may simply reflect the increased prevalence of these technologies in education over time.

Accounts of successful and unsuccessful technology use show that technology is central to the way that students undertake all aspects of their studies, from access through analysis to writing and production and on to submission of work. Their accounts show how densely interconnected their technology uses are – for example, switching between YouTube lectures and readings in order to understand academic arguments. Communication and collaboration also featured strongly, even though courses were primarily face-to-face. Respondents also suggested that technology use at the pre-tertiary level contributed to their independence, supported the development of time management and enabled them to become familiar with technologies that other students would “sometimes struggle” to use successfully. Pamoja Education alumni experienced some distinctive problems with technology use at the pre-tertiary level, most probably because they were using it more extensively and in more sophisticated ways than those only studying face-to-face. There were gendered patterns with these problems, with female respondents being more likely to report technical difficulties and males more likely to have experienced a lack of support from online teachers.

The most important ways IB Diploma participants identified to help them prepare for future online study were clarifying expectations; followed by support from schools, colleges, *etc* in the choice of University course; and then targeted website guidance; taster experiences; and summer school provision.

Finally, it should be noted that it was not possible to explore the experiences of students with special educational needs in a robust way within the survey; to understand this group’s requirements, further targeted work would need to be undertaken.

# Student interview analysis

This section of the report focuses on the interviews carried out with Pamoja Education alumni who had progressed to University. The purpose of the interviews was to develop a deeper, more detailed understanding of their experiences of pre-tertiary online learning, and their transition to University.

## Methodology

### Interview design

The interviews followed a semi-structured format. The reason for this was that the initial literature review and the project scope had identified a series of areas and issues that appeared to be important influences' on learners' experiences, and had highlighted that online learning is still developing rapidly at the pre-tertiary level, but had not provided detailed accounts about the specific experiences of Pamoja Education alumni. There were therefore important gaps that needed to be addressed.

The preliminary interview schedule drew from the issues identified in the literature review. This generated an extensive initial set of questions (38) – too many to be practical to pursue within any interview. These were simplified into the following broad question areas, with the remaining themes noted as prompts that could be used to develop the conversation as needed:

1. Could you describe the different online environments and digital materials you currently use at University?
2. How has your experience of studying Pamoja Education courses helped you prepare for the learning experiences you just described?
3. Will you say something more about how you use online and digital resources to manage collaborative and independent learning outside of class time?

The third question in particular drew attention to a priority area emerging from the literature review and the preliminary analysis of the survey data.

Given the distributed nature of the group, the interviews were conducted via Skype. They were recorded, and the recordings were fully transcribed. In addition, notes were taken during the discussion.

### The sample

Appropriate interviewees were identified on the basis of their survey responses. Invitations were sent to those respondents who were Pamoja Education alumni currently studying at University, and who had given permission to be contacted about follow-up interviews.



All participants were asked to give their informed consent for the use of the interview data, and were offered an Amazon voucher as an incentive to participate.

Gender	Age	Country of Origin	Which course are you studying at university?	Year of study	Which Pamoja Education course/s did you study?	First language	Other languages spoken
Female	19	Italy	Gastronomic Sciences	First	Psychology SL	Italian	English,
Male	20	USA	Chemical Engineering	Second	Economics HL	English	Spanish
Male	19	Germany	Computer Science, Math	Third	Spanish ab initio	German	English
Female	18	Canada	Economics and Business Administration	First	Economics HL	English	French
Female	20	Singapore	International Business	Second	Business and Management SL	English	German, Mandarin
Female		Canada	Economics/Politics/Philosophy (EPP)	Second	HL Economics		

Table 21: An overview of student interview participants

## The analysis

The notes and transcripts from the interviews were analysed thematically, drawing together accounts of experiences from across interviews. The themes are presented as separate sub-sections, below.

## Learners' experiences

### Experiences of online courses

Participants in the interviews described how studying online courses provided an opportunity for them to develop their independent learning skills; all of them agreed that this had increased their independence as learners. However, one noted that they found this sense of independence overwhelming at times.

*Having taken an online course in the past made me more comfortable and familiar.*

Their experiences of pre-tertiary online learning were important in developing their capacity to study at University; these experiences had allowed them to develop their skills. The Pamoja Education courses introduced learners to a wider range of technologies than other International Baccalaureate courses; however, some of these were not relevant to their degree programme, which used a narrower range of technologies than the Pamoja Education courses.

The participants made use of a wide range of technological tools; however, two noted their dislike for reading on screen, and one emphasised that they still made use of books alongside their use of technology.

The technological mediation of learning influenced the way they tried to build rapport with teachers and other students. Working with online teachers could be challenging, and it was important to check in regularly with the teacher and to see regular online support from them to counteract this. One participant found it harder to respect the teacher when they were just “text on a screen”, but also felt that the absence of the teacher encouraged more collaboration to take place between students in the physical classroom. Another participant suggested that the challenges of connecting with the online teacher were actually good preparation for dealing with the ‘distant’ staff at University.

*I mean, as bad as this sounds, and don't take this in a negative way, but it's much harder to really respect someone and to care about their opinion when they're just some text on the screen, and you barely, like... you don't really have a personal connection with this person.*

Collaboration with other students changed; this took place more with peers online than in the same school, although one participant noted that they shared their resources with other classmates in their school taking the same course. One participant felt that online learning challenged established nationality ‘groups’ within the international school in which they had been based. However, collaboration could be challenging: for example, collaborators were sometimes absent, and the participant did not know whether to flag this as an issue with their teacher or not.

One advantage experienced with online courses was that they could be dynamic – for example, they supported participation with and feedback from peers in response to blog postings, and they allowed theories and issues to be related to current affairs.

Feedback was an area of concern for some participants. One felt that the lack of instant feedback (when compared to the classroom) made learning difficult; another said that it had been most effective when supported by Skype conversations, allowing points to be clarified.

## **Preparation for University**

Studying online was felt to prepare students for University in several ways. As might be expected, the International Baccalaureate modules they had studied influenced their choice of degree at University. More interestingly, participants felt that their experiences had helped them to develop several practices that were valuable at University, including:

- Citing and referencing
- Speed reading
- Proof reading
- Presentation
- Secondary research

They also identified practices linked to self-regulatory behaviours (a topic that will be returned to later in this report), such as:

- Time management
- Communicating with teachers and learners
- Collaboration with other learners
- Adapting to different learning styles
- Coping with stress

One participant said they believed there were clear differences between Pamoja Education alumni and other students in these areas; another described the expertise they had developed as being a ‘secret’ that gave her an advantage over other students.

*I don't really like to share my secrets, because, I don't know; I feel like I have an advantage in the university, doing the IB and learning to do things by myself, and I learned a lot of skills from doing the IB, and even doing it online, where I can find my own sources, and stuff, and... I don't know; I just don't really like to give my secrets out to other people.*

One obvious area of preparation concerned their ability to use technology. Most participants felt that studying a Pamoja Education course had helped them to develop their skills and expertise, introducing them to a range of tools that they subsequently used (and were expected to use) as part of their online studies. Specifically, these experiences helped familiarise them with Virtual Learning Environments, and supported them in their ability to make appropriate selections from the tools that were available to them. Overall, this experience was felt to encourage future online learning.

*I think it was the skill set of actually working with the tools that I really gained from Pamoja Education.*

As noted above, participation in online courses had affected the ways in which participants studied, both collaboratively and in terms of their independence. Learners felt that working alone online had required them to become independent, and they saw this as useful preparation for University study. Online collaboration had similarly helped them to develop their ability to communicate and work with others. Such experiences could be difficult – but as one participant pointed out, this gave them firsthand experience of dealing with such problems.

## **Intercultural experiences**

Several participants described Pamoja Education’s courses as providing a truly global online classroom. There was evidence that this helped some participants to see their subject as international too, bringing in a range of perspectives and expanding on the ‘local’ teaching they experienced in school.

*The international nature of the course was very valuable because economics is like a global subject and I think if I'd taken it in, like, a classroom here in Canada I would have had a very Canadian mindset to economics. And so what I really enjoyed was, like, when we would be doing a reading each week it would include examples from all over the world and we actually had people on our course to comment on things from all over the world so it wasn't a very single country focus or anything which is something I found really valuable out of it.*

This sense of a global classroom brought benefits – participants said that it had helped them to understand a range of cultures and communication styles, had introduced them to different perspectives, and one participant described how collaborating with people from different cultures had helped them to develop skills and approaches that had since been valuable in other international projects.

*it was really beneficial for me because I do projects that are international in nature so now I'm... more experienced in how to deal with different cultures whenever I do my work.*

However, it also introduced challenges. Time differences made it difficult to connect with some other students, and this was associated with a lack of collaboration in the online classroom.

*I've taken online courses before, but they were within my school board so people are within the same time zone at the very least, so it's a lot easier to communicate. Whereas I was in a group once where there was only one other person that was even within Canada, and they had a three-hour time difference. I had people all over Asia and Europe, and honestly, it was just a really big mess to get the project done.*

*I thought it was really hard working online, though, with the time difference, and communicating with people, and getting answers back not straightaway was definitely something I did not like.*

These experiences had social as well as educational value. One participant described having 'bonded' with other students over common subject interests. Another said that they now had friends all over the world, and highlighted the importance of maintaining connections with other learners during the course, suggesting that more could be done to help maintain a sense of community once courses had ended.

## **Self-regulation**

In the interviews, participants described several ways in which they had developed self-regulatory practices.

For example, several participants described their approaches to time management. They talked about the need to avoid distractions, to be clear about their motivations and to use their time carefully to pursue these. One also described how they used online tools (such as Google Calendar) to help them achieve this.

*It's also helped me because there's a... at the end of the course, toward the exams, we were supposed to send the notes we were taking, just to show that we were actually studying and we didn't just forget the exams were coming up. So we had to create a sort of timetable. The first day I will study from page 1 to page 15, this day from page this to that, and it did help me understand more my speed in studying and taking notes and everything else, so it helped me in those different things.*

They also described several ways in which they had become more independent, setting and pursuing their own goals. For example, they found and used online resources either to pursue areas of personal interest, or else instead of asking the teacher for help. Two were even taking additional online courses, in addition to their University studies. One also described using external research to further their own career goals; another said that they had become more aware of their own preferred approaches to learning as a result of studying online.

*A course for learning Dutch, that's something I would have never thought of doing unless I have that flexibility to study in the evening when I have some spare time in the weekend. Instead, now it's something that comes to my mind. I mean, I think well yeah, I have some time left after dinner, I can use it as I want.*

As in earlier sections, greater independence was set against greater collaboration. Various tools were used to achieve this, including Facebook, Google Docs, Skype and Prezi.

## Discussion and implications

The interviewees described how pre-tertiary online learning had been challenging, but that these challenges had helped them to prepare for University study. Participants described how they had developed in terms of their ability to study online; their ability to work with learners from other cultures; and their capacity to direct and manage their own learning.

Exposure to online learning introduced students to a range of technologies that were used and sometimes even required at University – particularly when finding and using academic resources online, and making use of the Virtual Learning Environment. However, they also used technologies that were not relevant, and some still expressed a dislike of reading on screen. Although experiences with technology form an important contributing part of the preparation of students for University study, it is not a simple case of 'more is better'. However, students may find it useful to be told explicitly that some of their experiences with technology are laying the groundwork for their University studies.

Studying online had disrupted students' conventional relationships; they collaborated differently with students in the school, more with remote learners, and in difficult ways with their teachers. The introduction of technology built links to learners internationally, shifting the focus away from in-school collaboration; at least some of the students also found it harder for to build a sense of connection to their teachers. However, this was not

seen in purely negative terms, as it fostered self-reliance and was seen as useful preparation for autonomous work at University. A simplistic reaction to this situation might be to make tutors work harder to connect to the students, or to avoid group-based work because this is sometimes problematic; however, the value students described in these difficulties suggests that greater benefit would come from helping them to develop their capacity to build relationships with others at a distance, so that they become more robust and resilient in their approach to studying. There may also be value in promoting greater connections between alumni.

One practical aspect of studying that received attention was the need to manage time and deadlines; there may be value in identifying and sharing successful techniques for achieving this between students. Similarly, interviewees described the way that they used a range of tools to coordinate group-based tasks; these practices may also be worth sharing more widely.

# Staff interview analysis

Having identified challenges faced by learners studying online, the purpose of this phase of work was to develop a better understanding of how their teachers try to support the learners on their courses. This involved interviewing teachers of online courses.

## Methodology

### Interview design

As with the student interviews, the staff interviews followed a semi-structured format. This reflected the exploratory nature of the work, which sought to develop a better understanding of how staff identified and responded to the challenges that learners on their courses experienced.

The preliminary interview schedule was drawn from the analysis of the student interviews. The following questions were used to prompt areas of discussion:

1. Could you describe an example of when a student has needed additional help on the course? How was this brought to your attention and how were they helped?
2. What effective feedback mechanisms do you employ, and which do students comment most favorably on?
3. Could you describe how students' independent learning skills are developed throughout the course?
4. How have you helped students to manage the move away from more teacher-centered learning, towards greater independence?

As with the student interviews, the distributed group meant that interviews were conducted via Skype. They were recorded, and the recordings were fully transcribed. In addition, notes were taken during the discussion.

### The sample

Staff teaching on Pamoja Education courses were invited to participate, using adapted versions of the information sheets provided to the student participants, and all participants signed adapted informed consent forms. No incentives for participation were offered to this group.

Table 22 gives an overview of the participants in the staff survey. Heads of Department were senior staff, with direct experience of teaching online as well as an overview of the work that others in their department undertake.

Subject	Role	Gender
Business Management	Head of Department	Male
Information Technology in a Global Society	Head of Department	Female
Maths	Head of Department	Male
Psychology	Head of Department	Male
Psychology	Faculty Advisor Assistant	Male
Psychology	Teacher	Female
Spanish (ab initio)	Teacher	Female

Table 22: An overview of staff interview participants

## The analysis

As with the student interviews, the notes and transcripts from the interviews were analysed thematically. These are presented below.

## Staff experiences

### Teachers' perceptions of students' experiences

Staff were broadly positive about students' experiences on their courses, although they recognised that specific issues represented challenges.

*Students seem quite independent and they don't often encounter problems like that [...] they can work their way through it step by step [...] we really try and scaffold the work.*

The online teachers described their Pamoja Education courses as "more dynamic, a little bit more personal" than other online courses, in that they were very structured and about more than just reading texts and responding to them. As was noted, however, it was not enough just to provide this support in an online format – students had to know and believe it was there, too.

*As is often the case in education, there's that... the feeling of support is as much as the actual support, so a, kind of, almost psychological network of a student feeling if something's not working out, I've got somewhere to go.*

This was believed to be a challenge for many students as they joined the programme, because they were not used to recognising online support opportunities, and needed to learn to recognise and take advantage of them.

*Kids in schools, they think they have a lot of support from their teachers because they're in the same room as them.*

Students were expected to engage with the full range of opportunities in the course – including helping other students. This was justified both in terms of final reports on the student but also in terms of personal benefits for learning.



## Perceived differences between online and face-to-face study

The interviewees identified several ways in which they believed the experience of studying online was different from the traditional face-to-face experiences that students would have had.

For example, several teachers commented on the importance of providing clear instructions and scaffolding every step of the learning process.

*My analogy would be when your mum at 12 years old leaves you at home to bake a cake, it doesn't go very well if they say, "bake a cake" [...]. But if she gives a really clear recipe and clearly what to do, then you'll bake the cake and you will start to self regulate and look after yourself in that environment.*

This was necessary as a way of establishing expectations and conventions in a way that might happen tacitly in a face-to-face classroom. As one interviewee summarised: "online education can't afford a deep hidden curriculum in the way that schools can".

One area of difference was in the pattern of interactions that the interviewees had observed. This, they suggested, allowed more equitable patterns of contribution.

*Typically in a face-to-face school where discussion forums are dominated by the loudest voices and ... discussion in a classroom can be really quick and fast and often the teacher, you know, tends to take over and dominate that. With the online forums, when they're working well, you know, students have more time, the quiet ones can contribute and get their voice heard and I, you know, I just know by looking at the forums some of the best forum contributors wouldn't stand a chance in a face-to-face classroom.*

This theme – of different students flourishing online than in face-to-face classes – was developed in several of the interviews. It was suggested that students who might be capable but disengaged face-to-face but who worked independently took up leadership roles in the online environment. It was also suggested that schools are "all about classes, and the class has a personality, and the individual can get lost in the class personality", whereas individuals were able to receive attention and maintain their distinctive style online.

However, one area of concern was that relationships developed differently online than face-to-face, and this process was challenging to all the teachers involved. Teachers could not, for example, read the expressions of students in their class, and some felt that "students are quite happy not to be heavily involved with their online teachers", preferring just to work independently. This was challenging, although teachers remained positive about the experience.

*I had one student, [...] "you're like one of the only teachers that's ever really talked to me about stuff", because he was asking me questions like what do you like to watch on television. [...] When I first started I thought, oh, this is, as a teacher I thought this is going to be really weird. I'm not going to know these kids, but you get to know them through their writing and through the communication and they have great senses of humour.*

*I know them better than I knew many of my face-to-face students because I know them intellectually without really ever having been in their presence, and they know me in the same kind of limited way, and I think that they like that. It's different. There's a kind of adulthood about it that I think they find gratifying.*

Further detail about teachers' experiences of this, and their strategies for dealing with this situation, will be explored in the sections that follow.

All these points led interviewees to conclude that one valuable difference between online study and face-to-face classes was that the online courses provided a supportive environment in which students can develop self-reliance.

*I think that students probably find it surprising that they can connect with their teacher when it's online, that they can make that personal connection even though we'll never meet and that they can feel confidence that they will get the feedback and that we work together in terms of figuring out what is the best medium of communication to give feedback and that it's a partnership. [...] I think that's good that they know that they're not out there alone and that they can reach out, ask the teacher questions, get support, move forward and [...] increase in their independence and responsibility increases but they're continually supported. So I think that helps with their self confidence and they just continue to grow.*

This was challenging for some students: whilst "most students like that, some students are hesitant at first [...so] we have to provide a little more support initially". However, the challenge was considered to be worthwhile.

*I've found that students online will ask for help if they need it but I've also noticed that it's so much more obvious when they're not understanding because everything they do or almost everything they do is written down and so if you read it carefully, it's pretty clear when they need help.*

The central pedagogic issue for teachers in achieving this was to ensure that students were "being challenged just at the right level but supported so they go, yes, actually, I can do this."

## **Teachers' development as online educators**

Participants described their experiences in terms of the relationship with students and sometimes with the site-based coordinators (SBCs) whose role it is to support the online students in schools.

As noted above, teaching online felt markedly different from previous experiences of teaching face-to-face. One participant described this in terms of the "focus shifting from me being on the stage as a teacher, face-to-face classroom, I'm now behind the scenes and the focus is [...] on students' written work and all communication". Others echoed this change in emphasis by describing their role in terms of facilitation.

*I'm a facilitator of their learning. I'll make sure that they read, they participate, they have the feedback that would build on their information, or their knowledge, and help them to success in the exam, that's number one... And at the same time, make sure that they get the skill of you don't need me, you can trust your own self, in reading, writing notes, and preparing yourself for the next step.*

The emphasis in facilitation was on tailored support rather than group management. Central to this was feedback on tasks and assessed work. This, too, felt different when undertaken online.

*I actually think that I give more detailed feedback online than I do on a face to face situation... because I'm not there for them to look at their paper or listen to their presentation and then to have questions asked back, so I try to give them a lot more information when it's an assignment and give them tools.*

One participant felt that focus on feedback, rather than on designing and delivering the curriculum, was so different from their previous experience that it sometimes felt unsatisfying.

*Sometimes it feels like you're not really teaching because the curriculum is set and students' working in their own pace so all I get from them is their work, so most of the time I feel like I'm a grader.*

The emphasis on facilitation, rather than on being the focus of the class, meant that some participants became anxious about being 'too' present. For example, one described feeling that "sometimes I want to be more present in the discussion forums but I don't want to be overpowering, if that makes sense". This was linked to wider anxieties about online teaching, and the challenges of being able to 'read' the classes they were working with.

*It took me some time to let go because when they were not posting the work in time or whether, you know, I wanted the reaction, I wanted to know whether they understand it well and whether they're going to... I wanted more questions from them but it wasn't coming so, and that's what I was really missing because being in the classroom you have reactions, you have students asking questions, you have a dialogue with them and online it is quite slow.*

Further anxiety arose where students opted out of interactions, for example because they chose to watch recordings of online classroom sessions rather than taking part in them. Teachers recognised that this was a necessary part of students becoming self-directed learners, but nonetheless, accepting this was a real challenge.

*This is one of the hardest things for teachers to do, they simply have to let go. [...] If you want students to become responsible you have to allow them to be responsible, and that means that you have to let them go a little bit until, you know, until it's obvious that they, you know, that they're not going to*

*come back and then you have to do something, but it's that letting go that's the hardest thing for a teacher to learn. And I think for a student the hardest thing to learn is the teacher's not there all the time.*

Accumulated and collective experience has begun to make this easier. One participant, in their sixth year of teaching their course, described an evolution from a feeling that “it was up to the students to figure out this idea of self-regulation” to a point where their team had “a common terminology to these skills that we’re looking for students to develop, like self-management, communication, research skills, social skills”, so that these could be recognised, planned for and supported.

Part of this challenge was to provide support without over-committing teachers. Individual support does not scale well as class sizes grow, and several participants expressed concern that teachers would feel they were required to give more time to student support than was actually sustainable.

*I can't imagine having an online classroom with a hundred students because there's simply not enough time in the day to do the kind of careful evaluation and feedback that is absolutely necessary to make the online environment work. I mean, I know that your students are supposed to take responsibility for their learning and all of that, but if the teacher is not really focused and devoting a lot of time to the feedback process, it's really easy for all but the most dedicated students to just get lost.*

Linked to this was the need to manage students’ different interpretations of what was expected of them. The diversity of students – in terms of country of origin, cultural expectations, willingness to ask questions, and so on – meant that teachers “have to be very, very overt about what we’re asking students to do”.

*I have students in Ghana... but sometimes it could be in Africa or anywhere else in the world, in rural areas... while other students are in a well developed country... being respectful, learn[ing] how to communicate with students from different cultures, is a skill.*

A further challenge that was raised concerned the distributed responsibility for learner support. Teachers’ relationship with site-based coordinators (SBCs) was crucial. Some SBCs “are missing in action”, and this was something that teachers felt unable to resolve because there was no way of intervening with the SBC to change the situation.

*If it's good between me and the site-based coordinator and the site-based coordinator has strong skills and is able to communicate with the students then usually we see success, but if the site-based coordinator also suffers from a lack of organisational skills or communication skills then it also reflects on the student.*

## **Developing rapport with students**

In the student interviews, the sense of a personal connection with their teachers was of central importance. The teachers, in their interviews, gave careful consideration to this issue. Like the students, they felt that feedback (on assessment, and to questions put to

the teacher) was an important part of achieving this. As one participant commented, “that’s actually where they’ll form their strongest relationship with the student.”

*I think the students judge us on how responsive we are to their questions and their requests and how fulsome our feedback is.*

Teachers were clearly aware of the expectation, voiced in the student interviews, that such feedback should be prompt.

*It has to happen within a certain timeframe, otherwise the student feels a lack of support. So, basically, it’s going to be 24 hours, I’d say. Teacher goes beyond 24 hours up to 48 hours, the student’s going to start switching off.*

Typically, the timeliness of feedback online was seen as a challenge when compared to classroom-based courses, although the interviewees did identify exceptional instances when they were able to respond faster than a class-based teacher would.

*Sometimes in very important time, or before the deadline, I was able to be there. And I think that doesn’t always happen in a face-to-face class, where students just go to school, and wait till the next day, when they see the teacher. They rarely have a relationship outside of the school time.*

Additionally, teachers reported undertaking a lot of one-to-one support, responding to students’ requests either through the Learning Management System or Skype. Skype was mentioned frequently, and was an important part of how teachers managed to build rapport.

*I think Skype’s a wonderful tool for us, and in the first three or four weeks of the term, with a new group of students, all the teachers aim to make a Skype contact with the students, like a personal contact.*

*I try to talk to my students on Skype, because knowing that there’s a person behind a computer, makes a big difference.*

Email was also felt to be valuable, but lacking the immediacy of a Skype conversation. The visual element of Skype was also felt to be important, and was seen to contribute to the relationship in a way text could not.

*Right from the beginning, I try to talk to my students on Skype, because knowing that there’s a person behind a computer makes a big difference. And usually, my language, in emails or in texts, sounds more formal than when I talk to them. So, sometimes they would probably feel like I’m not that approachable when I write my feedback, but when I talk to them, they feel like oh, I’m friendly or they can actually talk to me.*

One tutor described using YouTube if Skype was impractical:

*If some student is in a different time zone, and it doesn’t work, I would record myself, or actually video record myself, and post it on YouTube and share it*

*with him, and say, this is me, and this is specially for you. Just to [...] build a relationship.*

Other feedback tools referenced included the text chat 'pager' tool, responding to blog posts, providing written or audio feedback on work via Dropbox, or using Google Hangouts.

After reaching out to students in the first few weeks of term, the tutors expected the students to initiate discussions. As a consequence, some of the participants grew concerned about students they had not heard from.

*They have to be responsible in reaching out to me, and say I don't understand this, can you please explain? The problem comes when students probably either get busy, or just ignore that need. And then it arises in a discussion or it arises in an exam, or in an activity. Then I realise, okay, there is a major issue here, and... I would reach out to the student and say, do you need any extra help with this?*

Finally, teachers described the importance of attending to personal comments and details, as well as dealing with academic matters.

*When they comment on, oh, I'm not able to do my work this week because I'm going on this service trip and I always make sure, well, how was your trip? [...] Doing small things like on Skype when it pops up says it's their birthday wishing them happy birthday, small personal things so that they know that we're still out there and that we care.*

## **Providing feedback**

Participants identified feedback as the single most important mechanism for building rapport with students, an important opportunity to support learning and as being the heart of their job as an online teacher. Feedback varied, however, depending on what was most important to achieve at any particular moment; sometimes, timeliness was most important, whereas sometimes, delays were acceptable because quality was the prime concern. It was also unclear what exactly counted as 'feedback'.

*Some students will feel they want more feedback, but [...] What do they mean by feedback? Do they mean feedback on assessed materials? Do they mean feedback on their, sort of, behaviour within the system? Do they mean feedback in... to their requests?*

One teacher suggested that greater clarity was needed about the scope of this term, so as to manage expectations. This is done explicitly in relation to the conventions of polite online behaviour ('netiquette'), to prepare students to work together online, but not for other areas.

Some participants found that students were keen to get fast responses, and would use pagers or instant messaging to contact a tutor.

*That seems to be a very popular tool in our subject because it seems like a lot of the questions are very quick. [...] They're more comfortable using that tool and they've used it in the past and, you know... maybe not academically in the past but certainly in their personal lives in the past.*

Such questions mostly related to course content, but also included questions about special educational needs, learning preferences or time management. Teachers spoke of the importance of creating an atmosphere in which students felt that they could ask questions, but felt (as discussed above) that some took up these opportunities more readily than others.

Where teachers were unable to provide immediate, synchronous feedback – for example, when supporting students in a time zone that might be “12 hours ahead of me” – they would record or write answers, in order to ensure that “within 24 hours they get their answer”. Alternatively, they can ask their peers or another tutor who does happen to be online.

*What students can do, they can post a question to that on the forum; [...] other students can answer the question as well so that way students can, kind of, help each other. [...] and] when the student goes online and they look at their class list, they see a list of all the students in the class but they see a list of all the [...] teachers as well. And when they see the green dot beside the teacher's name they know they're online, and we encourage students to ask anybody, any faculty member, if they've got a question.*

However, others reported that it was rare for students to request immediate feedback, and found that – on some courses at least – “attendance is really quite low” for scheduled live lessons.

At other times, teachers' priority was the quality of their feedback rather than its speed. Different approaches were used to ensure this. For example, teachers give feedback on assignments submitted via Dropbox, provide detailed comments using Word, or sometimes share comments via Google Docs. These approaches were valued because they enabled a dialogue to develop around the feedback.

*I can upload the work, and highlight and comment on specific [...] paragraphs, or sentences, and they, students can come back and reply to it.*

One participant, however, speculated that this may be of more value to some students than others.

*Using the Word review function means that you can go line by line through a text and point out where the problems are or ask questions about what's been said, and I had a couple of students last year who were particularly grateful for that kind of close reading. They were both exceptional students and so it's a little bit difficult to know, you know, whether less capable students would respond the same way.*

It was also felt that providing feedback in writing demanded more care from teachers.

*It's a bit of transition for teachers, too, because [...] they have to be much more thoughtful about their comments. [...] In a face-to-face, you know, you can smile and joke and give them a D minus and, kind of, jolly them along. But you can't do that online and you've really got to very clearly say why that piece of work wasn't up to the standard, or why this piece of work is excellent and they should continue to do it that way.*

However, asynchronous feedback also helped teachers to achieve this higher quality, giving them time and space to reflect on the work. This was contrasted with feedback face-to-face, where it was suggested that people “often they respond without really thinking about what you've written and what they're saying”.

*I could read a post, think about what they wrote and think about what's the best way that I can guide them or support them or, you know, build on their thoughts. So it's that time, kind of... that in between that creates that reflection which is unique, which I find is quite helpful in a lot of different learning outcomes that we're looking for.*

This was felt to be true for students, too, with asynchronous participation meaning that “students [...] spend the time to really put some careful thought into posting their ideas.”

*It allows the student to step back and take their time, and I found, you know, in face-to-face classrooms, when the teacher is always there and constantly asking how things are going, that doesn't happen as often.*

*The interesting thing about online learning, it really creates a space for careful thought and reflection so... when I have a classroom discussion in a regular classroom, it is instantaneous, but maybe it doesn't get to the depth and reflection that an online classroom can provide, where students can go back and think about...what they're saying before actually sending it off.*

Teachers also experienced this distance as helpful in focusing on the work, rather than on the personalities of the learners. This, they felt, enabled precision and avoided personal factors that resulted in “a lot more negotiating”.

*You're confronted with the student and so you're responding to their personality and, you know, what you perceive their problems are. Online you're responding to their text and I found, for me, that that's a very liberating kind of experience because you can criticise the text without worrying too much about the student taking that personally, and they have to learn that they have to be able to separate those two things and I found it's easier online to make that clear to them.*

Teachers were cautious, however, about appearing negative, particularly given concerns that providing feedback in writing could make them seem formal and unapproachable. They described, for example, how “I've got to put a lot of positive messages as well as critique”, not least because they were unable to see how students received the feedback and reacted to it.



## Supporting challenging students

Whilst personal contact and quality feedback enable relationships to be built with some students, these do not reach everyone. Some students can be reached by offering additional support.

*I've also had students [...] they were, for one, trying to deal with adjusting to the expectations of an IB diploma programme, and then at the same time trying to adjust to taking an online course. And, you know, they had some problems with technology as far as being able to have a regular internet connection and reliable technology, so there are a lot of adjustments that had to take place. So in that instance I had to set up more traditional studying where I was weekly having sessions with them, live sessions [...] with them to answer questions and make sure that they were adjusting to their course in a positive way.*

However, teachers worried most about the students who are absent from discussions, miss live classes, fail to submit work, and so on – the ones who need support, but “they’re not coming to us”. It can be very difficult to discern which students are quiet because they are experiencing problems, and which are quiet because they are working successfully on their own.

*Some of them are happy to work in their own pace and they don't want us to interfere and some of them need helping hand so there's two different things here and I have to identify who needs help and be more present for them in the online environment and those who don't answer and don't want anything, as long as they're producing good work and I'm happy with it, that's fine.*

In such situations, the site-based coordinator has a crucial role to play. The interviewees described how valuable it could be to talk with people who knew the students and their circumstances, understood their particular needs and who could provide specific forms of support if these were required, such as regularly scheduled supervision in a computer lab. This made it all the more frustrating when SBCs did not respond to emails or other forms of contact. The teachers had no way to resolve such problems.

## Preparing for University

The teachers identified a series of ways in which studying online might contribute to learners' readiness for University study. Part of this readiness involves taking responsibility for choices about learning; as the interviewees pointed out, their students have already made an unusual and distinctive choice in this respect, studying in a format that will be unfamiliar to them.

*The whole experience of taking an online course might be risky, and for them to see that it's risky for them. And they're not sure if they can do it, and taking that risk, and seeing that it works, is a good lesson. I think it's in life, in general.*

This is helped by the structured, supportive design of the courses, so that they can learn by trial and error from that experience in a low-stakes environment.

*I would say it's pretty low risk in the course because then they can learn from it and it's not going to be detrimental to the outcomes [...] like they do their first collaborative group project and some of them don't do very well but it's, okay, because they're going to have another try at it and they'll do better.*

These students have also taken responsibility in their choice of unusual topics of study, and in studying with a group and with teachers who may be from unfamiliar cultures and environments.

*I think they become open minded. They learn about different cultures, they learn how to respect others, even if they don't believe. Sometimes politics come into the class, and you need to learn how to deal, or learn more about what's happening in that country, and why it's affecting it [...] so I think that makes a student well rounded.*

The interviewees also felt that the pedagogy used on these courses provided opportunities for students to experience the kinds of approaches used at University.

*We have a lot of different things that we ask them to do. We ask them to read, we ask them to respond to questions, we do some, you know, construction of mind maps and some group work, and in the second year we actually have a seminar presentation through [Blackboard Collaborate], and I think that all of those things provide the kind of experience in careful critical thinking that university work demands or should demand.*

Such experiences are not always easy for students; for example, one teacher described how providing feedback can be unsettling and challenging, but that this is nevertheless a useful opportunity to develop a resilient, critical disposition.

*Often the first response to that kind of rigorous critique is precisely what you're trying to teach them to avoid, which is they get hurt and defensive, and they call in the Site Based Coordinator, but after they, after you talk to them and they realise what it is that you're trying to teach them, it seems to... it helps them mature.*

Similar challenges were described in relation to developing the capacity for reflection, for example by writing blog posts.

One obvious area was the development of time management strategies, including planning ahead, undertaking preparatory reading, contacting peers and teachers in advance, and so on.

*They have the ability to look ahead, plan their time, see what assignments need to be done, see if there's any group work, or a group project that needs to be planned ahead of time... So that teaches them to manage their time, to communicate with me, or with their other group members [...]. A lot of students don't have self-motivation, they are used to a teacher to watch over their heads and say you need to do this tomorrow, this was due, and there's a continuous reminder. That doesn't really exist in the same way in an online class.*

Some of this was expressed in terms of responsibilities; some was supported by providing checklists, patterns and other markers that helped students to structure their experience.

*Face-to-face environment, students are forced to go to a class at a certain time, whereas an online environment [...] they're being empowered and given more freedom to come to that course and set up their schedule to be effective and I think that's probably the biggest adjustment and assistance, you know, really that students need.*

One reason that time management was so important was that the automatic deadlines encoded in the course could not be re-negotiated.

*Dropbox closes and, you know, the curtain comes down and it's closed and there's no, kind of, oh, teacher can you take this, oh, I'm racing down the corridor.*

The students also took responsibility for choices about how they would study, the channels for communicating with their teachers or peers (email, Instant Messenger, Skype, etc), and so on. They also gained experience of working together with their peers, sharing out group roles, communicating online about the group process and work, motivating each other to contribute, and so on. This can be challenging; one teacher, for example, noted that students who were strong with conventional, individual reading assignments were sometimes "hesitant or less engaged" with the group-based tasks.

*Some of them have talked about, you know, learning to work with other people, trying to motivate other people on their team which they're going to have to do in university whether it's face-to-face or online as well. Yes, just learning to work with others [...] dealing with personality and work habits.*

These challenges are something that the teachers, as well as the students, had to adjust to; handing over responsibility for students' learning created anxiety, and the teachers had to learn to be comfortable with this.

*It is hard but when I just started working online; I've only done six months, when I just started I wanted to chase all the students who weren't there and I wanted to know where are they, what they're doing and why they're not submitting their work but now I'm more at peace with it because I think this is their learning and we're preparing them for university and there won't be anybody chasing them there so they've got to know that they have responsibilities and we have expectations and they have to fulfill them.*

Consequently, interviewees explained how an important part of the teacher's job was to support such experiences, to provide spaces where such behaviours can flourish, and then to draw attention to the kinds of behaviours that they want students to emulate.

*We're always, kind of, watching so the best example there is the discussion forum. So, you know, teachers and myself, we read every single post that*

*students write but we don't jump in and we don't take over the conversation, because as soon as we jump in the conversation ends. So that's, kind of, what we call this idea of skillful neglect. I think that's, kind of, preparation for university too. [...] The kids need to take their own initiative and I think at university, you would agree with me, that, you know, you can sit there and do nothing for a year or so and nobody's going to come to the rescue; you need to take responsibility for your actions there.*

There were instances where teachers continued to be challenged by students' choices, and had to balance their desire to foster preferred behaviours against the desire to develop independence.

*We also had to step back and say, well, we can't say that they're supposed to be self-directed and then say that we're going to direct them.*

## Conclusions

The teachers who were interviewed for this study showed awareness of the concerns of students, but did not always interpret the challenges that they experienced in the same way.

The experience of learning and teaching online is clearly different from face-to-face education. This difference was, primarily, framed in a positive way – although one less experienced teacher in particular found it challenging. Teachers expressed anxiety about building successful educational relationships with their classes, but were able to describe several strategies for working towards this, and explained the change in orientation towards trusting learners as a result of their commitment to fostering independence and self-reliance through “skillful neglect.”

Interviewees recognised learners' concerns regarding timely feedback, but differentiated between several forms of feedback, drawing a distinction between moments where speed was important in order to reassure students, and occasions where quality feedback was more important. The teachers argued that asynchronous feedback allows both them and their students more time to reflect on work, improving the quality of feedback. They also suggested that this kind of separation of the work from the individual (and their personality) enabled genuinely critical and challenging feedback, in a way that would be difficult to achieve with the student immediately present in a class.

Studying online also seems to engender different class dynamics, so that individuals who might be less engaged in a school are able to take the lead on tasks; it was also suggested that the supportive online environment provided low-risk challenges, so that students could fail in a safe environment and learn from their experiences, developing resilience for subsequent University study.

## Conclusions and implications

This project has explored the complexities of using pre-tertiary experiences of online learning to prepare students for the transition to University. Through the survey and interviews, it has identified where this has been particularly successful or problematic, and suggested some ways in which current provision might be developed.

Existing research has shown that online learning within schools is growing, but is often still seen as a remedial option for use when face-to-face provision is impossible. However, media comparison research has shown that online learning can be more effective than face-to-face teaching when it is carefully designed, largely because learners spend more time engaged in productive educational activities.

The self-regulatory behaviours are important for success at University, as demonstrated by the experiences reported in the survey. Time management and the coordination of distributed groups were identified as being particularly important. The use of teacher guidance, online tools and explicit opportunities to help students develop strategies they can use to manage these situations are all valuable ways to prepare them for this aspect of their University studies. In addition, the interviews that were undertaken with alumni suggested that students could also benefit from sharing the techniques they have developed themselves for dealing with these issues between them. Specifically, the interviewees discussed how they had developed strategies for using technology to manage time, keep track of deadlines and coordinate group tasks; students might benefit from sharing such techniques with each other both in terms of building a repertoire of ideas but also simply by raising awareness of these issues. The teachers who were interviewed were aware of these challenges, and saw online group work as a chance to gain experience in a low-risk, supported environment in which any failures could be seen as an opportunity for learning.

Other aspects of self-regulation that were considered important for success at University included goal-setting, independent problem-solving, standards-setting, knowing where and when to study, and asking for help from the instructor.

There was also evidence of an interesting shift in orientation between school and University, away from comparison with peers and towards management of personal progress. This may be an area where students could be encouraged to think differently about their progress as part of their pre-tertiary experience.

Within this study, evidence about the development of students' capacity for intercultural communication came mainly from the interviews. (This was not identified as a requirement for the survey.) The interviewees reported that their experiences with classmates from around the world had indeed helped them to develop their ability to work with learners from other cultures subsequently. Interestingly, they also reported that studying in this way had shifted their focus away from collaborating only within their schools, changing established dynamics with their everyday peers and tutors in way that could be challenging, but which expanded their horizons.

Previous literature emphasised that familiarity with technology was an important component of preparation for University study. Similarly, studies of young peoples' media use show that mobile devices are increasingly important; it may be possible to reflect this developing expertise in the design of courses, for example by developing components in a form that can be accessed via such mobile devices. The teachers who were interviewed added that giving learners responsibility for selecting the technologies they would use to communicate, collaborate or undertake tasks contributed to their independence and self-reliance, and so was part of their preparation for University study.

As the interview analysis suggests, it may be useful to draw students' attention to the fact that their pre-tertiary online experiences are laying the groundwork for subsequent University study, so that they are aware of the potential connections between these contexts of study.

The survey showed that, for these respondents, studying with technology at the pre-tertiary level primarily involves print-based resources supplemented by online resources in the classroom or at home. The learning environment in Higher Education was more complex than that at school, involving longer hours of study, greater use of mobile devices, and with study increasingly spilling into public settings. Interestingly, Pamoja Education alumni made slightly less use of print-based resources than their peers when studying at University, suggesting that their technology-rich experiences have set a pattern that persists into Higher Education.

The interviews with students showed the development of this pattern in an interesting way. Students who had participated in online learning whilst at school reported that they found aspects of this to be challenging. However, they did not necessarily view these challenges as problems to be avoided; instead, they felt that such challenges formed part of their preparation for University, because it enabled them to experience ways of overcoming them whilst working in a supportive environment. This was echoed by the comments from teachers, who saw online study as a safe, low-risk experience, in which students could explore new ways of working that they might need once they reached University.

Even though studying at University is organisationally more complex, it did not necessarily use as much technology as pre-tertiary study. The survey confirmed that University study involved greater use of Virtual Learning Environments, more searching for academic resources online, and more use of technology to coordinate group work; however, less use was made of many other technologies, such as the wikis, blogs, self-assessment tools, live classrooms or tools for creating multimedia resources that are used in Pamoja Education courses. In this sense, some students may currently be *over-prepared* for University study. As Universities adopt more use of technology within the learning environment, this balance may be redressed.

However, such experiences do not need to be institutional requirements to make them important. These aspects of pre-tertiary study gave students opportunities to enrich their formal programmes; they can now choose to undertake such practices as part of their studies, whether or not their course requires them. The open-ended questions within the survey showed students swapping between YouTube and course readings, for example,

supplementing the formal curriculum with a complex array of other resources and practices.

Communication and networking was identified in the literature review as being vital to successful participation in Higher Education. This covers both communication with peers, tutors and the wider academic community as part of the course, but also socialising as a means of adapting to the culture of Higher Education.

This was one area in which the survey analysis suggests that student would benefit from additional preparation. Whilst most students had experience of using a Virtual Learning Environment before University, for example, fewer felt prepared for coordinating group work, building relationships via social networks or discussing questions with tutors online. The Pamoja Education alumni fared better in this regard than other students surveyed. The teacher interviews suggested that this was one area where failure could be seen as a learning opportunity rather than a disaster; they also suggested that the move to online discussion enabled students who might not feel engaged in face-to-face classes to lead groups of peers.

In the interviews, Pamoja Education alumni reported that, initially, they had found it harder to build a sense of connection with their course teachers online than they did with their face-to-face teachers. However, whilst this was challenging at the time, they suggested that it was useful when they reached University, because it promoted self-reliance and helped them to overcome the challenges they experienced dealing with the relatively infrequent contact they had with University teachers. Experiences of networking and links to alumni networks may also be useful ways to cope with the increased autonomy that University study demands.

This was echoed in the interviews with teachers, who described the anxiety they felt over 'letting go' of students and cultivating the "skilful neglect" that fostered independence. It was important to the teachers that this "neglect" was strategic: the learning process designed by Pamoja Education, supported by the experience of the online teachers resulted in teachers having several strategies for building relationships with learners. This meant they were attentive to the need for contact, motivation and support, but also developed the capacity to give students the space to be independent where they wanted this.

Feedback constituted a particularly important form of connection between students and teachers. Students drew comparisons with the 'instant' feedback available face-to-face; teachers, however, differentiated between motivational or problem-solving feedback (which they agreed should be timely, and for which they often used Instant Messenger or Skype) and critical, reflective feedback on assessed work (for which quality, not speed, was their primary concern). They identified advantages for both students and staff in taking time when working with critical feedback.

Finally, it is important to note two limitations on this work. Firstly, the experiences of learners with special educational needs could not be adequately covered in this study, due to the low participation of individuals who classified in this way. Secondly, the full analysis of the interview transcript will be provided separately, and this may yield further insights into the problems and opportunities identified here.

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# Appendix A: Implications for Pamoja Education

This project was funded by Pamoja Education, and drew on data provided by alumni of Pamoja Education's courses, as well as by staff teaching on these courses. Consequently, several implications follow from the studies that have direct relevance for Pamoja Education's work. In this appendix, these implications are summarised.

## Implications arising from previous literature

The eight themes identified in the literature review can all be mapped against Pamoja Education's work.

1. Technology and Online Learning in Schools: Pamoja Education's courses are designed to provide flexible learning environments that immerse students in creative, social and critical uses of digital resources. This approach is consistent with the recommendations arising from the literature. Consequently, alumni should be well placed to capitalise on these experiences within Higher Education.
2. Using online resources and digital technology to support student induction: since student readiness for Higher Education is shaped in part by their technical fluency and familiarity with Virtual Learning Environments, Pamoja Education's current online model serves several useful orientation functions. Alumni from these courses will have had substantial and varied exposure to interactive online environments, preparing them for entry into Higher Education and subsequent online courses.
3. Using online resources and digital technology to facilitate student social interaction and sustained involvement throughout Higher Education: Pamoja Education's courses require students to be active online and engaged with their peers. These experiences should help alumni to make a productive transition to working in an online Higher Education environment, which requires students to take greater responsibility for coordinating their work and for working with peers. However, opportunities may exist to develop academic writing for wider audiences, building students' engagement with the academic community even further.
4. Using online resources and digital technology to differentiate instruction and develop student-centred approaches for diverse learners: not all of the approaches identified in the literature are suitable for online learning – for example, lecture-based voting systems may have little to offer distributed, primarily asynchronous courses. Many of the remaining technologies are already used within Pamoja Education's online offering. This suggests that these programmes already embody many of the recommended principles for differentiated learning.

5. Using online resources and digital technology to enhance student academic learning and HE skills development: given that online collaboration, critical analysis, technical proficiency and web awareness are seen as valuable for post-study employability, Pamoja Education's courses (which provide such experiences) should play an important role in developing students both for their studies and future work roles.
6. Using online resources and digital technology common to everyday experiences to develop contemporary communication competencies: Pamoja Education courses already integrate examples of interactive media that reflect everyday uses of technology; this may provide sufficient motivation and support to learners by establishing links between academic study and wider use. Further use could be made of mobile technologies to support study, however.
7. Using online resources and digital technology for self-regulated learning: the approaches recommended in the literature are already visible within Pamoja Education courses, as well as in the International Baccalaureate programme more broadly. These activities are believed to contribute to self-efficacy, independent learning and autonomy, which are identified in current literature as being necessary for successful online learning experiences. If these are seen as areas that are important to develop, such pedagogic approaches could be deployed more widely.
8. Using online resources and digital technology to facilitate intercultural communication: an important focus in recent literature has been on developing cultural competence through online exchanges with participants from diverse cultural backgrounds, rather than focusing purely on language acquisition. This suggests that alumni from Pamoja Education's modules will be well placed to develop their capacity for intercultural communication and collaboration, since these courses already incorporate the orientation towards shared academic achievements rather than simply towards language acquisition.

Pamoja Education's courses clearly have value by providing students with diverse, differentiated pedagogies and experiences of technology that they will need for degree-level study. Technology use around transition to University is frequently discussed in terms of providing information, because this is of value to all new students; however, direct experience with technology will differentiate between students as they begin their studies. Such experience forms a core component of Pamoja Education courses, which incorporate VLE use, require online information searching, make use of streamed videos, require use of collaborative authoring tools and provide multimedia resources, for example.

It is less clear whether these experiences also help students to socialise and network once they reach Higher Education – social strategies that are seen as important to their subsequent success. These aspects could be explored further, since they could also lay the groundwork for the development of connections with peers, tutors and the wider academic community through new forms of communication and collaboration.



Students' capacity for self-regulated learning is argued to develop through pedagogies that promote discussion, interaction and the management of personal goals. Similarly, meaningful interactions with learners from different cultural backgrounds can develop students' capacity for intercultural communication. The pedagogies used within Pamoja Education courses support exactly these kinds of activity. However, there are areas in which it would be possible to extend the current pedagogic model used on Pamoja Education courses still further. The course developers could therefore consider:

- The extent to which students are engaged with the type of extended reading and writing tasks commonly required at university, in addition to engagement with more structured and scaffolded learning tasks. Prior research suggests that the closer the fit between the pre-tertiary and Higher Education experiences, the more effective these will be as preparation for Higher Education study.
- Linked to this, students could be invited to practise their ability to communicate with peers and with tutors about their academic issues by designing such interactions into their courses. This would provide them with opportunities to rehearse such conversations as preparation for University study.
- The learning context of the students should be seen as multifaceted, including not only the Virtual Learning Environment, but also the physical, temporal and institutional context in which the student is engaged. Previous research has shown that mobile technologies can disrupt established patterns of educational provision, and study at Higher Education requires more autonomy. To develop the preparatory element of Pamoja Education's modules further, it may be possible to incorporate a wider range of forms of engagement, requiring increasing levels of responsibility for self-directed study in addition to the structured classroom-based activities. It may also be possible to extend Pamoja Education's current provision by developing courses (or at least, components of them) in a form that could be accessed via such mobile devices, which research shows are increasingly important to students.
- The cultural diversity of learners on Pamoja Education courses is an asset, providing opportunities to develop intercultural communication. It may be possible to make this an explicit factor in the design of some of the pedagogic tasks they undertake. This would provide students with supported experiences in which they could develop their capacity to work with linguistically and culturally diverse peers in HE settings.
- More broadly, students entering Higher Education benefit from the use of social networking sites and other networking tools; creating such networks increases their chances of successful participation. Pamoja Education could consider the value of fostering such networks – both as a direct network, but also to provide students with opportunities to practice such networking themselves. This could be undertaken within the module, or amongst alumni.
- Students could be encouraged and supported to discuss the wider rather of technologies and resources that they draw upon during their studies. This would promote the independent identification of valuable resources and also share

these amongst learners. Viewing learning as distributed across multiple technologies, sources and communities, rather than purely undertaken within the Virtual Learning Environment, would provide a closer fit to Higher Education engagement in terms of complexity of self-regulated learning.

## Implications from the empirical studies

Because the survey and interviews draw heavily on data provided from alumni and staff associated with Pamoja Education courses, it is difficult to separate implications for Pamoja Education from implications more generally. The case-based nature of this project means that all conclusions are necessarily claims about experiences of Pamoja Education's courses; their relevance to other courses remains a matter of interpretation. There are however several findings that relate specifically to course design and student experience on Pamoja Education courses.

Pamoja Education's students make far wider and more complex use of technology than the non-Pamoja Education survey respondents. Whilst all students rely primarily on print-based resources (either in the classroom or at home) for their pre-tertiary studies, Pamoja Education alumni are more likely to make extended use of desktop computers. Mobile devices were used by a substantial minority of respondents, mainly whilst at home; this supports the possibility of developing components of Pamoja Education courses in a form that can be studied using mobile devices. At University, whilst all students report longer study hours and more complex patterns of study, Pamoja Education alumni made slightly less use of print-based resources than other respondents, although the reason for this is not clear. Similarly, they were less convinced of the value of note taking, extra-curricula study or turning to an instructor for help.

Respondents generally reported less use of technology at University than at pre-tertiary level; this is likely to reflect the intensively online pre-tertiary experience provided by Pamoja Education courses. This might suggest that not all uses of technology are useful as preparation for University study; however, survey responses showed that these were all still valued. Technologies that saw less use at University included live online lessons, creating multimedia resources, writing on blogs and using self-assessment tools; ones that were most valued as preparation for University included using Virtual Learning Environments, finding academic resources online, coordinating group work, building relationships via social networks, discussing questions with the tutor and using multimedia resources for revision. There may be value in drawing students' attention to the uses of technology that they are likely to experience when at University; this will ensure that they are aware of the value of these experiences.

There were some areas where the survey analysis suggests that student would benefit from additional preparation. These included coordinating group work, building relationships via social networks or discussing questions with tutors online. Experiences of networking and links to alumni networks may also be useful ways to cope with the increased independence that University study demands.

In the interviews, Pamoja Education alumni reported that they had found it harder to build a sense of connection with their course teachers online than they do with face-to-

face teachers. However, they also suggested that this was a useful experience in terms of preparation for University study, since it promoted self-reliance and helped them to overcome the challenges they experienced dealing with the relatively infrequent contact they had with University teachers. Pamoja Education teachers were aware of these problems and have developed techniques to address the situation, but nevertheless took some time to adjust to the feeling of 'letting go' of students, in order to give them the space they need to be independent.

Pamoja Education alumni experienced distinctive problems with technology use at the pre-tertiary level. However, this is likely to reflect the extensive and relatively sophisticated uses that they were making of them, compared to those only studying face-to-face. These problems were primarily concerned with collaboration, group coordination and other pedagogic and social issues, rather than operational concerns about how to use specific technologies.

Students reported having developed friendships internationally, and saw value in keeping in touch with other students after the course. They suggested that Pamoja Education could do more to help maintain a sense of community once courses had ended.

Generally, the difficulties that students experienced were recognised as having value. This was recognised both in the interviews with students and with teachers. Pamoja Education alumni did not necessarily view these challenges as problems to be 'solved'; instead, they felt that such challenges formed part of their preparation for University. They believed that the courses enable them to try out strategies for dealing with problems whilst working in a supportive environment. Consequently, alumni claimed to have developed in terms of their ability to study online; their ability to work with learners from other cultures; and their capacity to direct and manage their own learning. These are all positive endorsements of the value of experiences on Pamoja Education courses as a form of preparation for University study.

## Appendix B: Developing Student Readiness for Online Learning

The literature referenced in the review above explores factors and variables that influence student readiness in online learning programmes. The studies, reviews and articles suggest a strong relationship between student readiness and attrition/retention. Several studies discuss specific learner profiles and characteristics that are likely to influence retention. Other studies identify factors affecting student dropout in online programmes. In some cases, the literature points to actions that can be taken to better prepare or support at-risk students for successful completion and participation in online learning environments. The table highlights key areas of focus in relation to student readiness in online learning.

Developing student readiness for online learning	
Focus of literature	Examples and citations
Student Readiness Instruments and Indicators	Use of rigorous survey instrument for students to self-assess readiness for online learning (Dray, et al, 2011).
	Student capabilities associated with success in distance education are examined and identify factors linked to student readiness (Haigh, 2007).
	Analysing learning characteristics that influence satisfaction and success in online learning programmes (Yukselturk, 2009).
	Exploring learner profiles and the connection among student entry characteristics, participation and course outcomes (Yukselturk & Top, 2013).
Student Attrition Profiling and Prediction Patterns	Profiling student readiness to predict dropout rates (Inan, Yukselturk, & Grant, 2009).
	Developing a prototype web based support tool, which can automatically recognise students with high probability of dropout, has been constructed using machine learning techniques (Kotsiantis, Pierrakeas & Pintelas, 2003; Lykourantzou, et al, 2009).
	Developing a method of early identification of participation patterns and prediction of dropouts to improve online teaching (Nistor & Neubauer, 2010).
	Identifying factors that influence student drop outs (Willging & Johnson, 2004).
	Predicting student drop outs through data mining approaches in online programmes (Yukselturk, 2014; Yukselturk & Inan, 2006).
Student Retention Design and Interventions	Suggests some of the causes of low student retention may be that distance students are often older, have more obligations, or that lack of face-to-face contact is not effective with some learning styles (Carr, 2000).
	Review of literature to identify actions that can be taken to increase retention rates in distance learning (Gleason, 2004).
	Exploring design and student learning orientation to increase retention (Martinez, 2003).
	Increasing student retention through proactive interventions (Simpson, 2004).

## References and Abstracts

**Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *The Chronicle of Higher Education*, available from <http://eric.ed.gov/?id=EJ601725>**

Reports that anecdotal evidence and studies by individual institutions suggest that course completion and program retention rates are generally lower in distance education courses than in their face-to-face counterparts. Suggests some of the causes may be that distance students are often older, have more obligations, or that lack of face-to-face contact is not effective with some learning styles.

**Dray, B.J., et al. (2011). Developing an instrument to assess student readiness for online learning: a validation study. *Distance Education*, 32(1): 29-47, available from <http://eric.ed.gov/?id=EJ923809>.**

Given the continued growth in online learning as well as reports of high attrition rates in it, understanding student readiness for online learning is necessary. Over the years several surveys have been developed to assess student readiness as a predictor of success in online programs; however, a review of the literature yielded limited results of their translation and criterion-referenced validity. The researchers of this article sought to develop a more rigorous survey instrument for students to self-assess readiness for online learning. The authors report on findings from a three-phase study during which the instrument was developed, evaluated, and validated. Through the process of validation, the researchers systematically engaged in an iterative process to refine the instrument, which resulted in not only a more rigorous instrument but one that more clearly defines ready and situates it within the literature on learner characteristics, digital divide, and information and communications technology (ICT) engagement.

**Gleason, BJ. (2004). Retention Issues in Online Programs: A Review of the Literature. Paper presented at the *Second AIMS International Conference on Management*. Available online from <http://www.thinairlabs.com/papers/216.pdf>.**

No matter how a program is delivered, be it face-to-face or online, there are going to be students who, for one reason or another, cannot complete the course of study. However, the retention rates for online programs appear to be significantly lower than traditional face-to-face classes. While many of the reasons students drop-out of educational programs are common to both modes of delivery – such as pressures from home or work – there are some reasons and issues that are unique to the online environment. A review of the literature reveals that while fewer students complete online programs, there are some actions that the schools can take to increase the online retention rate, and allow more online students to graduate.

**Haigh, M. (2007). Divided by a common degree program? Profiling online and face-to-face information science students. *Education for Information*, 25(2): 93-110, available from <http://www.editlib.org/p/102290/>.**

This study examines profiles of online and face-to-face students in a single information science school: the University of Wisconsin-Milwaukee School of Information Studies. A questionnaire was administered to 76 students enrolled in online course sections and 72 students enrolled in face-to-face course sections. The questionnaire examined student capabilities in four areas associated with success in distance education. These are: basic communication skills and access to the Internet, motivational styles, preferences for individual vs. group work, time management issues, and attitudes toward online education. Online students were more comfortable than face-to-face students communicating electronically, had better access to the Internet, and reported better typing skills. Face-to-face students reported themselves to be more reliant on class participation to stimulate their interest in a class, and were more favorably disposed to group exercises. Online students were very much more likely than face-to-face students within the same institution and degree program to believe that online education was of comparable quality to face-to-face education.

**Inan, F.A., Yukselturk, E. and Grant, M.M. (2009). Profiling potential dropout students by individual characteristics in an online certificate program. *International Journal of Instructional Media*, 36(2): 163-176, available from <http://www.eurodl.org/?p=current&article=616>.**

This study examined the prediction of dropouts through data mining approaches in an online program. The subject of the study was selected from a total of 189 students who registered to the online Information Technologies Certificate Program in 2007-2009. The data was collected through online questionnaires (Demographic Survey, Online Technologies Self-Efficacy Scale, Readiness for Online Learning Questionnaire, Locus of Control Scale, and Prior Knowledge Questionnaire). The collected data included 10 variables, which were gender, age, educational level, previous online experience, occupation, self efficacy, readiness, prior knowledge, locus of control, and the dropout status as the class label (dropout/not). In order to classify dropout students, four data mining approaches were applied based on k-Nearest Neighbour (k-NN), Decision Tree (DT), Naive Bayes (NB) and Neural Network (NN). These methods were trained and tested using 10-fold cross validation. The detection sensitivities of 3-NN, DT, NN and NB classifiers were 87%, 79.7%, 76.8% and 73.9% respectively. Also, using Genetic Algorithm (GA) based feature selection method, online technologies self-efficacy, online learning readiness, and previous online experience were found as the most important factors in predicting the dropouts.

**Kotsiantis, S., Pierrakeas, C. and Pintelas, P. (2003). Preventing student dropout in distance learning systems using machine learning techniques. In *Knowledge-Based Intelligent Information and Engineering Systems*, 267–274. Available online from [http://link.springer.com/chapter/10.1007%2F978-3-540-45226-3\\_37](http://link.springer.com/chapter/10.1007%2F978-3-540-45226-3_37).**

Student dropout occurs quite often in universities providing distance education. The scope of this research is to study whether the usage of machine learning techniques can be useful in dealing with this problem. Subsequently, an attempt was made to identifying the most appropriate learning algorithm for the prediction of students' dropout. A number of experiments have taken place with data provided by the 'informatics' course of the Hellenic Open University and a quite interesting conclusion is that the Naïve Bayes algorithm can be successfully used. A prototype web based support tool, which can automatically recognise students with high probability of dropout, has been constructed by implementing this algorithm.

**Lykourantzou, I.; Giannoukos, I.; Nikolopoulos, V.; Mpardis, G. and Loumos, V. (2009). Dropout prediction in e-learning courses through the combination of machine learning techniques. In *Computers & Education*, 53(3), (pp. 950-965), available from [http://ac.els-cdn.com/S0360131509001249/1-s2.0-S0360131509001249-main.pdf?\\_tid=a90ba086-fbbb-11e3-9e5f-0000aacb35d&acdnat=1403627096\\_1feafb3888e347f3bf38571225df800a](http://ac.els-cdn.com/S0360131509001249/1-s2.0-S0360131509001249-main.pdf?_tid=a90ba086-fbbb-11e3-9e5f-0000aacb35d&acdnat=1403627096_1feafb3888e347f3bf38571225df800a).**

In this paper, a dropout prediction method for e-learning courses, based on three popular machine learning techniques and detailed student data, is proposed. The machine learning techniques used are feed-forward neural networks, support vector machines and probabilistic ensemble simplified fuzzy ARTMAP. Since a single technique may fail to accurately classify some e-learning students, whereas another may succeed, three decision schemes, which combine in different ways the results of the three machine learning techniques, were also tested. The method was examined in terms of overall accuracy, sensitivity and precision and its results were found to be significantly better than those reported in relevant literature.

**Martinez, M. (2003). High attrition rates in e-learning: challenges, predictors, and solutions. *The Elearning Developers' Journal*, available from <http://www.elearningguild.com/pdf/2/071403MGT-L.pdf>**

We know that learners frequently do not complete online courses. Reasons offered range from "e-Learning is e-Boring" to "they got what they needed and quit." This article explores another possible reason, a mismatch between learning orientation and e-Learning design.

**Nistor, N. and Neubauer, K. (2010). From participation to dropout: Quantitative participation patterns in online university courses. *Computers & Education*, 55(2): 663-672.**

The academic e-learning practice has to deal with various participation patterns and types of online learners with different support needs. The online instructors are challenged to recognise these and react accordingly. Among the participation patterns, special attention is requested by dropouts, which can perturbate online collaboration. Therefore we are in search of a method of early identification of participation patterns and prediction of dropouts. To do this, we use a quantitative view of participation that takes into account only observable variables. On this background we identify in a field



study the participation indicators that are relevant for the course completion, i.e. produce significant differences between the completion and dropout sub-groups. Further we identify through cluster analysis four participation patterns with different support needs. One of them is the dropout cluster that could be predicted with an accuracy of nearly 80%. As a practical consequence, this study recommends a simple, easy-to-implement prediction method for dropouts, which can improve online teaching. As a theoretical consequence, we underline the role of the course didactics for the definition of participation, and call for refining previous attrition models.

**Simpson, O. (2004).**The impact on retention of interventions to support distance learning students. In *Open Learning*, 19(1): 79-96, available from <http://www.94669.mrsite.com/USERIMAGES/Open%20Learning%20impact%20inter vs.pdf>.

There is increasing interest in student retention in open and distance learning. This article look at the role of proactive interventions from the institution to its students and discusses concepts such as the maximum possible increases in retention and issues such as who to target for intervention, the different types of retention possible and which media to use. It surveys the evidence for the effectiveness of such interventions both in and outside the UK Open University (UKOU) and concludes that in the case of the UKOU there are clear financial benefits to the institution, the individual and the UKOU's funding agency, the UK Government.

**Willging, P.A. and Johnson, S.D. (2004).** Factors that influence students' decision to dropout of online courses. *Journal of Asynchronous Learning Networks*, 8(4): 105–118, available from <http://sloanconsortium.org/jaln/v13n3/factors-influence-students%E2%80%99-decision-dropout-online-courses-previously-published-jaln-84>.

Although there are many reasons why students dropout of college courses, those reasons may be unique for students who are enrolled in an online program. Issues of isolation, disconnectedness, and technological problems may be factors that influence a student to leave a course. To understand these factors, an online survey was developed to collect data from students who dropped out of an online program. Logistic regression analysis was used to compare various factors between those who persist in the program and those who dropout. The results, based on the dropouts from three cohorts in an online graduate program, show that demographic variables do not predict likelihood of dropping from a program. Instead, the students' reasons for dropping out of an online program are varied and unique to each individual. Recommendations for further study are incorporated in the conclusions.

**Yukserlturk, E., et al. (2014).** Predicting Dropout Student: An Application of Data Mining Methods in an Online Education Program. *European Journal of Open, Distance, and E-Learning*, available from <http://www.eurodl.org/?p=current&article=616>.

This study examined the prediction of dropouts through data mining approaches in an online program. The subject of the study was selected from a total of 189 students who registered to the online Information Technologies Certificate Program in 2007-2009. The data was collected through online questionnaires (Demographic Survey, Online Technologies Self-Efficacy Scale, Readiness for Online Learning Questionnaire, Locus of Control Scale, and Prior Knowledge Questionnaire). The collected data included 10 variables, which were gender, age, educational level, previous online experience, occupation, self efficacy, readiness, prior knowledge, locus of control, and the dropout status as the class label (dropout/not). In order to classify dropout students, four data mining approaches were applied based on k-Nearest Neighbour (k-NN), Decision Tree (DT), Naive Bayes (NB) and Neural Network (NN). These methods were trained and tested using 10-fold cross validation. The detection sensitivities of 3-NN, DT, NN and NB classifiers were 87%, 79.7%, 76.8% and 73.9% respectively. Also, using Genetic Algorithm (GA) based feature selection method, online technologies self-efficacy, online learning readiness, and previous online experience were found as the most important factors in predicting the dropouts.

**Yukselturk, E. and Top, E. (2013). Exploring the link among entry characteristics, participation behaviours and course outcomes of online learners: An examination of learner profile using cluster analysis. *British Journal of Educational Technology*, 44(5): 716-728.**

Online learner profiles have diversified such that now, they include all types of participants from a variety of backgrounds. This study analysed online learner profiles in regard to their entry characteristics, participation behaviours and achievement of course outcomes. The sample consisted of 186 participants from an online course that required the employment of synchronous and asynchronous communication methods over the Internet. The data were collected through five online questionnaires and included 10 variables (gender, age, work status, self-efficacy, online readiness, self-regulation, participation in discussion list, participation in chat sessions, satisfaction and achievement). A two-step cluster analysis, chi-square analysis and multivariate analysis were used to analyse the collected data. The results indicated that online learners fell into three significantly different clusters and within each cluster, learners had a close combination of employment characteristics, gender type, age level, perception of self-efficacy for online technologies and participation behaviour level.

**Yukselturk, E. and Inan, F.A. (2006). Examining the Factors Affecting Student Dropout in an Online Certificate Program. *Turkish Online Journal of Distance Education-TOJDE*, 7(3), Available from [http://tojde.anadolu.edu.tr/tojde23/pdf/article\\_6.pdf](http://tojde.anadolu.edu.tr/tojde23/pdf/article_6.pdf)**

This study examined the factors affecting student dropouts in an online certificate program. In this research, a combination of quantitative and qualitative methods was used. Online Course Dropout Survey was developed and used to determine which factors affect student attrition from the program. The dropout survey was sent by e-mail to 98 students who had dropped the program. Twenty-six students returned the survey.

The findings show that the most important factor affecting student retention is finding sufficient time to study. Having personal problems and affordability of the program took second and third place.

**Yukselturk, E. (2009). [Do Entry Characteristics of Online Learners Affect Their Satisfaction?](#) In *International Journal on E-Learning*, 8(2), (pp. 263-281).**

This study analysed learner characteristics that affect satisfaction in an online certificate program under two main purposes. The first purpose was to examine relationships among selected variables (age, gender, educational level, and online course experience), learners' initial perceptions (online technology self-efficacy, online learning readiness, locus of control, and prior knowledge about program courses) and learner satisfaction. The second purpose was to examine program instructors' views about the factors that contribute to the learners' satisfaction in the online certificate program. Sample of the study consisted of four program instructors and 103 voluntary participants who attended this online certificate program in 2005-2007. Both quantitative and qualitative methods were used to collect relevant data in this study. Six online questionnaires were used to gather quantitative variables and semistructured interviews were conducted to gather instructors' views. The statistical results indicated that three learner characteristics (educational level, online learning readiness, locus of control) showed a significant relationship with learner satisfaction. Also, the qualitative findings from interviews with instructors generally revealed results complementary to these statistical results.

